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ABSTRACT

This book consists of 19 selected papers that focus on the broad topic of education in the South Pacific. All the papers were originally presented at the Fifteenth Annual Conference of the Australian College of Education, which was held in May 1974. Titles of the papers include "Educating for Self Reliance (the Buntine Oration for 1974)," "The Need for a Cultural Programme: Personal Reflections," "Education for What?" "Cognitive Development and the Papua New Guinean Education System: Some Findings," "Monitoring Educational Development in a Foreign Culture--Spotlight the Problem Areas," "South Pacific Educational Resolve," "Curriculum Development in Primary Education: The Papua New Guinea Situation," "Devils or Angels? Pupil Misdemeanors in Papua New Guinea Primary Schools," "A Study on Mathematics in Papua New Guinea," "Secondary Social Science in Papua New Guinea--Dvelopmental Success, Implementation Failure?" "The Place of Agriculture in the School Curriculum," "Power over the Environment--An Attitude to the World," "A Relevant Technical Education," "Difficulties in Improving the Quality of Teachers in Papua New Guinea," "The 1971 Report on Higher Education in Papua New Guinea--A Look Backwards and Forwards," "Theological Education in Papua New Guinea," "Selecting and Training Papua New Guinea Educational Administrators," "W.G. Groves: His Work and Influence on Native Education Especially in Papua and New Guinea," and "Nicholai N. Mikluho-Maklai (1846-1888), Pioneer Educator in New Guinea and Melanesia." (JG)

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PREFACE

This Volume consists of a number of selected papers presented to the Fifteenth Annual Conference of The Australian College of Education. The Conference was held at the University of Papua New Guinea from 4 to 9 May, 1974 in conjunction with the Waigani Seminar. Joint sessions were held as well as those for College Members.

"Education in the South Pacific" was the theme of the Conference but aspects of education in Papua New Guinea were the subjects mostly covered in the papers read.

The Buntine Oration which is given every second year in honour of the late Walter Murray Buntine was delivered by Mr. Michael Somare, Chief Minister of P.N.G. — a unique occasion never likely to occur again.

The theme was divided into three general sections, viz. 1. The Cultural Setting; 2. Education Systems (Primary, Secondary, Tertiary & Further Education); 3. Curriculum Issues in developing countries. Two historical papers were also presented.

Unfortunately not all papers can be published. A complete list is included in the Annual Proceedings of the Fifteenth Conference.

INTRODUCTION

THE EDUCATION SYSTEM IN PAPUA NEW GUINEA

The 1974 National Conference in Port Moresby caught the Education System in PNG at a point of intensive self-examination and re-direction — a characteristic which is reflected in the papers presented.

In a way it would be asking the Australian reader too much to outline possible new directions on the assumption that he understands their point of departure from the present. The fact is, PNG's Education System today is so radically different from an Australian system that it must be studied afresh as a basis for understanding new directions likely to emerge.

So often, after we have painstakingly described the current operations, of, for example, our Teachers' Colleges, we find out Australian visitors going on to say — "Fine . . . . now, what about the private (church) colleges?" The fact is that, with the exception of one church College which wishes to remain completely free of government involvement, all church Teachers' Colleges are members of the national education system, sharing with the government Colleges the same common benefits, national policies and curriculum, appointment procedures, etc. As with Teachers' Colleges, similarly with other educational institutions: the great government — private cleavage in Australian education is not known in the integrated education system of PNG.

Australian visitors are likewise intrigued by other now-routine features of the PNG education system developed during the period when Dr. K. McKinnon was Director.

One of these, necessary to the integration of a number of private bodies into a national education system, is the establishment of a governing body for each educational institution, with formal powers under the Ordinance over such matters as planning the development of the Institution, managing its budget, collecting fees and appointing staff. Another important feature of decentralization is the District Education Board, again with formal powers under the Ordinance in relation to planning the development of education in its district, opening new schools, appointing staff, controlling admission to schools.

Other contemporary features of a system whose history totals less than three decades may be traced back to Australia's accelerating post-war determination to develop PNG rapidly. Some visitors were surprised at the extent to which English is used, others at the implications of reliance on a foreign language for the curriculum generally and in particular for the respect with which the younger generation will therefore treat their indigenous language and culture. What the Conference did reveal, in all its ugly dimensions, were the tremendous tensions generated as education, as agent of modernisation and westernisation, has helped to create expectations which are far beyond the capacity of the nation to satisfy.

So — to the turmoil for the battle for the future.

The Conference presented visitors with Papua New Guinean professionals, the heavy responsibility suddenly thrust upon them, agonizing over the decision as to what changes in the education system will both solve the massive problems and at the same time symbolize the rejection of colonial presence establishing that they are masters in their own house. Hovering in the wings were the expatriate "experts", prescriptions (often conflicting) at the ready. In the background politicans thundered major changes in constitution and education. Will there be provincial government? Will the politicians insist on education for all regardless of whether teachers or the other resources are available?

The theme of the Conference was "Education in the South Pacific". It was expected that the venue would mean that most of the papers would be devoted to the Papua New Guinea situation, but there would be some papers devoted to other araes; this expectation was realised. Particularly pleasing to the College were the number of Papua New Guineans who participated in the exchange of views, as authors of papers, chairmen of sessions, or as members of the audience. Equally gratifying were the numbers of people from countries in the Pacific region and other developing countries; observers came from Africa, Jamaica, Ceylon, British Solomons, Tonga and Indonesia.

Although no specific suggestions were made to potential speakers in a review of the papers that were presented one theme clearly emerges: the necessity to have an education system which in its organisation, aims, and curriculum content is in harmony with the expressed wishes and needs of the people. In his Buntime oration the chief minister of Papua New Guinea, Mr. Michael Somare — himself an ex-teacher — discusses the dilemma faced by his government when the wishes and needs of the people may not coincide. When attempts have been made to make education more relevant to the needs of the people, these may be denounced at the highest level as moves by the Government to introduce an inferior system of education. Yet if attempts are not made to make education more relevant, ultimately education will contribute towards the destruction of traditional Papua New Guinea society rather than towards its progress.

Dr. Max Maddock highlights the potential social danger of education in his study of scientific attitudes among Papua New Guineans. His results indicate the formal school system is developing a serious cleavage between the products of the system and those not fortunate enough to get to High School.

Two Papua New Guineans take up the theme of relevancy in education. Nelson Giraure's autobiography well illustrates how his traditional values were supplanted by another alien set, and his traditional skills were never allowed to develop.

Paulias Matane, Churchill Fellow and novelist, concludes that the present form of primary school is an alien institution and two-thirds of its graduates are regarded as failures because they cannot go on to High School.

Another Papua New Guinean, Alan Isoiamo, while agreeing on the necessity to develop a curriculum which is relevant to the needs and interest of the children and the community, stresses that Western education serves two functions useful in Papua New Guinea: it provides an entree to a language and a technology from which Papua New Guinea can benefit, and it provides a medium for the interchange of cultural values, while stressing the need for change and adaptation. Denis Donohoe shows the problems that arise for students opting for Western style intellectual development; he analyses the role of educational testing to show how it can monitor the progress of students who need to master this form of skill.

That the concept of having an education system which is relevant to the needs of the community is not new is shown by the work of Groves and Mikluho-Maklai. Meg Duncan examines the work of Groves over 30 years in 3 Pacific countries and shows that his constant aim was to make education relevant to local needs. An interesting account of the work of the Russian scientist and educator Mikluho-Maklai is written by his descendant R. W. deM. Maclay; in it we find this remarkable man stressing the need to relate education to village needs and traditions in the 1870's.

While agreeing on the necessity to have a curriculum appropriate to the needs and culture of the child, other authors provide testimony that this is a most difficult accomplishment. Philp and Kelly show that language imposes its own views on the world, and stress that teachers must investigate the language spoken by their pupils to check that there is no cognitive clash between what is taught in school and what is taught at home. Beth Southwell investigated the mathematical comprehension of teachers and students and found a social factor at work: despite attempts to make the mathematics program more meaningful to pupils, it appeared that girls were performing poorly because the community expected them to perform poorly. Rev. Dunstone discusses the theological training offered by the United Church, and shows how the church has been concerned to develop a course of training which is relevant to the needs of the community, and does not alienate a trainee from his own culture.

Several authors look at certain difficulties in the classroom. John Pollock discusses the social science curriculum which was specially designed for Papua New Guinea, and notes that it has not fulfilled its earlier hopes because of the reluctance of teachers to espouse new teaching concepts and methods, and the very details of the curriculum have tended to make it prescriptive rather than suggestive. Geoff Coyne found that the most common forms of misbehaviour in Papua New Guinea primary schools are not very different from a similar list compiled 400 hundred years ago in Scotland! Furthermore, whilst educational administrators and theorists have been urging teachers to use the vernacular in their classroom teaching, the teachers view their pupils' use of it as a misdeed!

In developing countries, one often hears the cry for schools to produce people with technical skills. Patrick Pycrs believes that much of the present technical education system is wasteful, and that technical training can be improved only when the status of technological studies is improved. J. A. Sutherland points to the important role agriculture should play in the school curriculum; since "rural production is the economic wealth base; it is to the improvement of rural production that these countries must chiefly look in order to make economic progress".

Lewis Larking takes up Beeby's thesis that before an education system in a developing country can be up-graded, there must be an improvement in the general education of the teachers. His research makes one re-consider whether the high-level qualities assumed desirable in a Western education system are attainable or even desirable for a developing country.

The difficulties of implementing change are examined from an administrative point of view. Dr. Nash, a member of the Brown Committee which enquired into higher education in Papua New Guinea four years ago, discusses the obstacles which have prevented many of the Committee's recommendations from being implemented. Dr. McNamara traces administrative attempts during the last ten years to make the Papua New Guinea Department of Education as fully staffed by Papua New Guineans as possible: he concludes that the rate of such localisation is determined, not by bureaucratic planners, but by changes in social climate arising out of political decisions.

The reader may make his own judgment of what has been achieved, and what is likely to be achieved, in Papua New Guinea education. But one matter seems clear: a fundamental massive social change is leading to re-orientation of the education system, making Papua New Guinea an exciting place for educators to work in.

THE BUNTINE ORATION 1974 — EDUCATION FOR SELF RELIANCE

MR. MICHAEL SOMARE,
The Chief Minister, P.N.G.

Traditional education taught the people of Papua New Guinea self-reliance. Every skill learnt in the village was specically aimed at helping a child to get through his adult life with a maximum of security, and a minimum of inconvenience. Even the stories and legends handed down from parent to child had a meaning — a moral to the story which taught the child a little more about his environment.

However, the white man has changed this. Whereas before traditional education was the knowledge of how to enjoy life in the village, western education in Papua New Guinea has become a means of getting away from the village, to the attractions of the outside world, the city life, the bright lights. In Australia education has been geared to help school children towards their own self-reliance. But when the Australian education system was transplanted to our society, it no longer worked towards that aim. A transposed Australian education system has made the educated, most often the natural leaders of communities, move away from their own communities, in search of more money and a more Western style of life. These natural leaders — the better educated members of our society — have fallen victim of an inappropriate education system. The past education system, instead of providing educated community leaders, has actually deprived communities of their leaders.

Because an Australian way of life — by its very presence here — has been held up as a desirable goal, our people in Papua New Guinea still do not realise that education can be either beneficial or harmful in our society. There are far too many people in Papua New Guinea who believe that our country's ideal is a society similar to Australia.

This was shown when Cabinet attempted to take action on adjusting our education system to better suit the people of this country. One of the Government's first moves was to announce that Papua New Guinean children should no longer attend Australian curriculum schools. The decision was attacked on all fronts.

It seems that even the best educated men in our society still see a revision of education policy towards a system better suited to our Melanesian society, as somehow inferior to the ideal that Australia has set in the past.

So even while we attempt to revise education policy we recognise that there may be, within our own society, considerable resistance to any revision that can be interpreted as lowering educational standards.

At the same time the community demands of its government more education for more people. It is not only our own people who demand this. In June last year the British delegation to the United Nations called on the Papua New Guinea Government to give greater priority to education. There is no doubt that my government agrees with these demands and sentiments.

But, as always, money is limited. We must be sure that every cent spent on education as a real investment in the future development of Papua New Guinea. We cannot afford education for educations sake. It was Britain which gave such high priority to education as the answer to the development problems and social ills in India, for instance, that forced university graduates to take work as labourers to earn enough to live. We note the points made by Britain at the United Nations — but we will also learn from Britain's past mistakes.

It is essential then to consider the justification of the costs of each component of education, and to gear educational goals to our eight point plan.

I have said that in order to justify the expense of education we must be sure that its benefits flow back into our real society. Despite the problems that we are already experiencing with urban unemployment and migrant settlement development in our main centres, the majority of our people are still in the villages of Papua New Guinea. That is where 90 per cent of our people still live. A recent discussion with other South Pacific leaders on the role of technological education in Papua New Guinea and the Pacific Islands, made this same point.

We must take technology and education into the villages and gardens — to the place where most of our people live and work. It was obvious from that discussion that the other South Pacific nations are experiencing similar education problems.

It cost in 1972, $44,300 to place just one student at the University of Technology in Lae. That money is a real investment *only if* the student later contributes towards a real improvement in the social and community life of the community. But it is money wasted if all that learning simply becomes a means to gain for the graduate the comforts that academic learning can bring. Our country needs to produce men who have learned how to put a shovel to the most effective use — *not* how to exchange the pick and shovel for a desk and air-conditioned office.

If my government fails to take the benefits of education to the rural communities, then it has failed to serve the vast majority of our people. And at the same time education will have contributed towards the destruction of our real society as we know it, instead of towards its progress.

The theme of this talk is self-reliance in education. I have spoken of education's role in producing self-reliant communities. I have spoken at length on this because I believe that all too often the meaning of the words 'schooling and training' are misunderstood. They should be interpreted as the development of skills which will be essential if our students are to work for their own, and their communities' maximum benefit.

Training and schooling should encompass technical and practical skills, as well as social and managerial skills. Before my government can revise education policy, the desirability and priorities for these skills need to be studied and spelled out in a full education plan.

A successful education programme relies on certain key attitudes within our own society, while at the same time the programme should foster the right attitudes. In particular these are: *initiative, responsibility* and *effort.* Allow me to take these points one by one.

Our own communities must have their own initiative — the ability to recognise the problems, and to find solutions.

At the same time there needs to be a sense of responsibility — in which communities realise that local problems noted local solutions — answers that are within the capabilities of local capabilities and resources. And lastly there needs to be effort — the commitment to ensure that problems are successfully resolved.

My government believes that the development of these three factors is essential to the future success of our education aims. There is no lack of initiative in Papua New Guinea — but, as in most countries, people tend to react to problems by demanding that the government solve them. This has been particularly true in the education field.

My government has encountered real difficulties in its efforts to encourage community involvement in our education needs.

Papua New Guinea societies will have to tailor their education demands to the limits of their own resources. The government has attempted to assist this aim. However, in two areas in particular — secondary school selection and boarding school fees — we met opposition. This was not direct opposition — but resistance from a community attitude which, as yet, does not accept the true meaning of self-reliance in education.

The communities' reaction to revised policy on secondary school selection which attempted to give selection powers to district boards of management, was to pass decision back to education department headquarters in Port Moresby.

Boards were reluctant to take up this responsibility, and there were charges made of favouritism—or as we would call it 'wantokism' in board selection procedures. The House of Assembly eventually called for a return to the selection system which gave headquarters the control.

At the same time it is still proving difficult to convince people of the very real need for the payment of boarding school fees. Up until about 10 years ago boarding schools were free, but then there were very few high schools. Today there are a total of seventy-two high schools and the government simply cannot afford to spend all its education finance on this one aspect of education.

It is government policy to encourage day high schools. The government believes that day high schooling better prepares a child for later life. A boarding school existence removes the child from his traditional and cultural contacts with his own people, and often fails to prepare him for the realities of life at home, and at work as an adult.

Of course there are problems with students who return home in the evenings to a house without electricity and other comforts — but these are problems with which he will have to cope later anyway.

All this leads then to the government conclusion that in order to develop our self-reliant education programme, we must show our people the need for self-reliance.

Until we have done that we will never be able to teach self-reliance in the schooling system.

However, not all our efforts in this direction have met with failure. Recent Papua New Guinea education gazettes have featured stories of communities which are making a considerable contribution towards our self-reliant aims.

In my own electorate, at Ila'ahita primary school in the east Sepik district, parents built four new classrooms, and during the construction work passed on their various building skills to their own children. The signpost that now stands outside the school was carved by the students themselves — the carving skill taught to them by the father of one of the children.

At Kompian, in the western highlands, councillors and the community came together to find solutions to the school leaver problem. I mentioned the school leaver problem earlier, when I spoke of the damage that education without purpose or relevance could do to our society. Kombian school leavers have not become part of that problem. A self-help plan was designed by the people, and with local government assistance, now employs many school leavers who might otherwise have become part of our country's youth and unemployment problem. The students cultivate an area of land of 20 acres, stock with farm animals and fish, and experiment with crops. They are also attempting to improve traditional methods of subsistence farming. The important aspect of this exercise is that, in order to achieve this, the Kompian people firstly recognised the problem, secondly found their own answers and thirdly carried out that answer with a minimum of outside help. These are, of course, the essential factors for self help that I mentioned earlier: initiative, responsibility, and effort.

Later these school leavers will help solve some of the problems of the community which has supported them, emphasising the benefits of education as an investment in Papua New Guinea.

It is important — and this again is a furthering of our self-reliance philosophy — that decisions on the future education policies for Papua New Guinea, are made by our own countrymen. I think it would probably be true to say that many of our own teachers now feel that their own education was not ideal for 'a teaching life in Papua New Guinea'.

I know that when I first entered the teaching profession, after schooling that was based on the Australian curriculum, I began to question the usefulness of my education, in assisting me to teach the children of my own country. I was, perhaps, better prepared to teach Australian children.

My government sincerely hopes that Papua New Guinea's teachers will assist our efforts to change education policy, by translating their frustrations with past policies into constructive thought for future policies.

I wish to speak briefly here about culture, because education is the most sensitive area of culture. The decisions we will make in education will affect our entire culture — the basis on which we wish to build our nation. Education can replace culture or it can teach the values of it.

A particularly important aspect of the Papua New Guinea cultural scene is language — or more correctly — the hundreds of languages that exist in our country. Language is a sensitive and emotive issue, and it both unifies and divides our society. Arguments have been put forward, particularly by people from other countries, against the use of vernacular in teaching.

However, I believe that there are strong arguments to support the use of vernacular at primary level, and the government already allows the use of local languages at lower primary level, where the community expresses an interest, and where teachers are able to instruct in the language.

The government is now considering the possibility of making vernacular the language of primary education, where possible. Communication problems have been experienced at a primary level in schools where children must learn English before they can be taught. Experiences in countries like the Philippines, Africa and Indonesia seem to show that the basic skills of reading and writing, after being taught in vernacular, are used for a more effective English language teaching programme. The use of vernacular at an early level also seems to assist children to relate better to their own environment, appreciate their own cultural values, and make them more psychologically secure.

Our culture should be, of course, a major factor in deciding school curriculum.

In this field, too, there are considerable problems, but again, our primary aim must be community involvement and self reliance. There is inequality between districts in the resources available for education. If education becomes a district responsibility, there is real reason to believe that this inequality between districts may widen. Examples of these inequalities are found in the availability of teachers from one district to another, and such economic problems as the facilities available for the production of books and other school aids.

Our education policies of community involvement and self reliance dictates that we should allow the districts to set curricula best suited to their needs and interests. This has already been done successfully in social studies courses.

The education department headquarters is attempting to close the inequality gaps between districts through other efforts. There is a special emphasis on involvement of our own staff from the less well-off districts in our curriculum conferences at headquarters.

Education policy on the distribution of finance can also assist greatly in our efforts to close the gaps.

I have discussed in broad terms the initiatives taken, and some of our plans, which we hope will re-structure our education systems towards self reliance.

It is in this context that I wish to close by drawing attention to the organisation that I am addressing — the Australian College of Education.

When our country gains her independence, the Papua New Guinea chapter will cease to function in its present form. Local members of this chapter will soon have to decide the future form, and the reasons for a Papua New Guinea college of education.

I hope that some of what I have said will assist members of the chapter to make those decisions.

THE NEED FOR A CULTURAL PROGRAMME: PERSONAL REFLECTIONS

NELSON GIRAURE, T.C.
Director, Cultural Activities, Department of Education, P.N.G.

I can still remember the day when I joined the system—that is, the system of education. Up until that day I had been a Tolai child leading a normal Tolai life. My life till that time had been full of fun, laughter and games. At my birth my parents had called me Giraure which in the Kuanua language means, "to look after" because I was born a frail child and my parents were not sure whether or not I would live or die. They did know, however, that if I was to live I would need a great deal of looking after. I survived and the name "Giraure" rang out among the houses of our village people.

On the day I joined the education system this changed. I was now at a mission school and like the other hundreds of children in the Gazelle Peninsula I was to find I was to have a new name. No longer was I to be called Giraure as this was a heathen name and as I was at a Christian school I was to be called Nelson, the name I was baptised with. Indigenous names were not suitable for baptism because of their heathen background. The missionary seemed to think that many of these names were associated with evil. Hence names like Winarubu which in my language means, "fighter" and Kankan which means, "angry" were replaced with good Christian names such as Martin and Ronald. It was only later in life that I discovered that Martin means "war-like" and Ronald means "great warrior". So much for Christian names! Christian names were handed out by missionaries with little thought to their meanings. Names such as Rose, Violet, Lily were given to children regardless of the fact that the Kuanua people had no knowledge of what they represented. No self-respecting Tolai would have allowed his daughter to have been called Lily.

So my first day at school brought about my first break with my traditions. I had lost my village name.

The village school I attended was a Methodist School run by Tolai teachers who had been educated by Fijian missionaries. We soon learned to love going to school, knowing full well that if we were absent we would be given a beating by the teacher. It's amazing how quickly we learnt. On the whole, I was lucky in attending a mission school as my first years at school were in the vernacular and I had the opportunity of learning to read and write in my own language. In this way I was much more fortunate than those children who went straight to a Government school.

After several years at the mission school it was decided that I was bright enough to continue my education at a Government school. The Government school meant a walk of about four miles each day. Despite my years at school I was put back into Class 1 to begin my education in English. It was at this school that I had my second break with my traditions.

I was no longer allowed to speak Kuanua. All conversations had to be in English despite the fact that at this stage I had no English vocabulary. Teachers made sure we followed this "Golden Rule" by forever shouting at us, "Hey you, speak in English". Large signs bearing the words, "You must speak English only", were displayed throughout the school. Children caught breaking this rule were punished with grass-cutting, extra work or smacks. I remember being completely inhibited during my first years at school. I could no longer chat idly with my mates. I could no longer make fun through speech. My quick wit was of no use to me. I was like a vegetable. I was controlled by the limits of my vocabulary. My days were spent listening to my teacher. Many questions I wanted to ask remained unasked because I did not have the ability to express them in English. Eventually, I found it much easier just to sit and listen rather than attempt to speak, so I sat and listened.

Most of the content that was being taught to us was as foreign as the English language being taught. Although music has always played an important part in the life of the Tolai people and although there is a great variety of Tolai songs to be learnt, these were not introduced in our schools. Most of our dancing was considered evil. The Duk-duk Dance, the Spirit Dances and those dances relating to war were forbidden. When dancing was introduced into the school or the community, these dances were ignored. Instead they were replaced with a variety of Highland reels which were originally the war dances of the Scottish people, or by children performing any one of a number of Fijian dances dating back to the old head hunting times. Our own songs—the lullabies of our people, the love songs, war chants, work songs and the fishing songs were neglected. These were never taught during our school time and because so much of our time was spent at school these were not learned in the village.

In this way we grew away from the village community because the language of the village was no longer our language and their songs were no longer our songs. Instead we arrived home each night chanting verses from the hymns we had been taught or singing new songs like, "Humpty Dumpty" and "Baa-baa Black Sheep". None of us had ever seen a sheep let alone heard one and for myself it was many years before I discovered that it was an animal we had been singing about and not a ship. I'm quite sure that in Papua New Guinea today there are still thousands of children who every time they sing this song still visualize a black boat going by.

During holidays at Christmas and Easter when I was home in the village and when there was the occasional dance being performed I did not join in. I stood aside and watched for I was a school boy and village dances were not for me. Later, as I grew older and learnt how lustful these dances were supposed to be, I became completely Europeanised and at parties in the village I performed with my peer group such new dances as rock and roll, the twist, and so on. So much for the music of my people!

As it was for music so it was for the other subjects in the school. Social Studies became not the study of our village community but the study of communities in other countries. We learned of the Red Indians, how they hunted, how their houses were built, their legends and songs. We learned of the Eskimoes, of their igloos, their hunting methods, and the animals which lived in their land. We learned of great powers like Russia and America and the the way in which their people lived. All this was new to us so we just sat back and listened and listened and still listened. At no time were we taught about our own people. The way we lived was considered unimportant. Our legends and myths were never told to us. Our customs were never discussed. The big men in our village did not compare with the big men from overseas.

So we grew up in ignorance of the value of our own community. Our heritage which had been handed down for generations was allowed to die. As more children went to school the dying process was speeded up.

In art the achievements of the Tolai were again ignored. Instead of carrying on the traditions of the Tolais, we accepted a new art form imposed upon us by our teachers. Those of us in mission schools soon learnt to draw Jesus crucified on the cross or other pictures illustrating scenes from the Bible. We learnt how to do scribble patterns, how to fill in geometric designs, how to make paper string for Christmas and a whole variety of uses for coloured paper. Such was our art instruction and soon the walls of our village houses became covered with stick figures in chalk secretly stolen from our school.

A similar process occurred in all other subjects. Our community was forgotten. We were the leaders in a new way of life. During our primary years this attitude was continually reinforced by our teachers. We were told that the most important thing was to pass in order to go on to High School. Everything was to be sacrificed to this. Over and over again we were told that only the fools and the 'bush kanakas' would return to the village. The bright children would continue on, get jobs and earn big money for their parents. Our parents, too, were brain-washed in this regard and they were very anxious for us to continue our studies.

By this time we looked with horror upon village life. To go back to the village was a fate worse than death. However, some children did go back to the village. These were the 'fools' and the 'bush kanakas' who could not pass their final exams. They went back to the village and as they grew older they planted cocoa and coffee. They started trade stores and ran business trucks. Soon the money began to roll in. They became important in village life and were looked upon with respect by the members of the village. The 'fools' and the 'bush kanakas' had become successful. Our teachers had given us the wrong story.

In the meantime, the brighter students had been promoted to High Schools. They studied for years, each growing further away from the way of life of their people. At High School the speaking of Pidgin or Kuanua was considered a great crime. Anyone found speaking these languages was severely punished. Students caught speaking these languages had to return their weekly ration of tin meat and sticks of tobacco. Besides this they had to dig latrines or spend extra time at work in the school gardens. It was at this time of our life that most of us began to hate agriculture as it was nearly always associated with some form of punishment.

Besides this, most agricultural work was done in the heat of the day, our European teachers being unaware that most Tolais slept at this time and traditionally worked their gardens in the cool of the morning. As our teachers supervised us from the shade of trees or buildings, they never actually discovered for themselves just how hot it was.

During our years at High School further links with our people were broken. The chewing of betelnut in any form was disallowed. This was considered by Europeans to be a filthy, disgusting habit. No one seemed to realize that in village communities throughout Papua New Guinea the habit of chewing betelnut was an important social custom and European teachers never failed to remind us what a dirty habit it was. This was told to us as they ground their cigarette butts into the floor and blew their smoke into our faces.

So we left High School—students with a new way of life; students with little in common with the old village ways. We went out into the world armed with our new education to challenge life and seek jobs. At that time most of us were lucky as jobs were plentiful and youths with education of any kind were scarce. We dressed ourselves in white-collared outfits wearing shoes and long socks. We were the new elite.

Later on as thousands more children like us came out of the schools jobs became more scarce. Soon because of the large numbers of children attending Primary School places in High Schools became harder to get and the pressures on the Primary School child to succeed were intensified. Because of economic factors, higher education became available to only a portion of school children. The result of this was that thousands of children, dissatisfied with village life, invaded the towns to seek the jobs which they felt were their right. Other children returned to the villages having little in common with the people among whom they were to live. The result was and still is chaos, both in the towns and the villages.

Papua New Guinea is experiencing a new problem—that of juvenile delinquency. As a teacher the break-down in village traditions and life has been very apparent to me.

Like my years in the Primary School and the High School, my years at Teachers College drew me further away from my people. At Teachers College I was given programme after programme of European-inspired content matter. I was considered unable to produce material suitable for teaching. So every day, every lesson, every hour of my teaching career was planned for me. This was something I accepted along with the hundreds of other student teachers. When I graduated I went out into the field and taught in exactly the same way that I had been taught. I taught European songs, I taught about other countries and about other people. I ignored the local community. It was only after several years that I began to realize that through my teaching the children were learning how to grow away from their own people instead of learning how to accept their community and where possible to improve it.

A few years ago, I was made to realize how impractical my own education was. I was on a boat sailing between the islands along the Manus

Coast. A European teacher and I were relaxing at the back of the work boat watching an uneducated Manus Islander trolling for fish. He had three lines spinning from the back of the boat. Suddenly fish struck at all three lines. Grabbing one line, the islander immediately started to pull in a fish. Then ignoring the European teacher, he thrust another of the lines into my hands. Immediately, I started to pull although probably I was struggling as much as the fish. With rapid movements, the islander hauled in his first fish. This was soon followed by another. I was still struggling with my line when he reached out and pulled in my fish as well. Then turning to the European and back to me he raised his eyebrows, shrugged his shoulders and said laughingly, "tu mas skul".

Afterwards, I spent many hours thinking about this incident. Had the Manus fisherman been right? Had I too much school or was I given the wrong type of schooling? How was it that I, Giraure, a Tolai whose home is only twenty yards from the sea and whose people had always been fishermen, grown up without knowing how to pull a fish in?

Looking back, I think that I didn't have too much schooling but that the school curriculum was not balanced. It contained too much that was foreign and not enough about the background of my people.

Perhaps a new curriculum whose content contained not only the knowledge of the overseas people but also the knowledge of the people of Papua New Guinea might be more useful. It might foster a pride in and an understanding of this country's way of life.

Although this will not do away with juvenile delinquency, it will certainly give both parents and children a better chance of making the best possible use of education—but a new education—an education for their needs.

EDUCATION FOR WHAT?

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People all the world over do things the way they do because that is the way they were brought up to do them. What they do and the way they do them depends on many things such as their attitudes, values and beliefs. These were determined by a number of factors including the environment, climate, etc. The basic differences in people are not differences in intelligence but differences in culture.

Papua New Guineans are very good in story telling. If they want to pass on a message to others effectively, they describe it in different terms in short stories. It is usual that they remember the message for years by recalling the stories with which they are associated.

In this short paper, I will try to use that effective method to bring out a simple message, always keeping in mind the title of the paper—"Education for What?"

As most of our people live in rural areas, our present government is putting a lot more emphasis on development there than in the past colonial days. It is obvious that many of us here today are busy assisting the government to see that its aims for rural development are carried out. It is expected that many of our students now attending various institutions will help in the future. It is natural to expect that my paper will discuss some measures relating to rural living.

Here I would like us to keep a rural village man, named Dan, in mind as an example. When he grows up, he builds boats, catches fish and does all sorts of things, not because he has been to a formal type of school but because that is what others do. Normally, he is happy and contented.

Interest and initiative not to miss out help him to do more and to be different. Competition and pride help him to create changes in attitudes—attitudes to do things, to others and to life. But are all changes good? It is up to the individual to come to some sort of conclusion. It is not surprising to see that conclusions are varied according to people's taste. For example, if a nice grass house is built here, I would like to move into it, while a man next door would prefer a permanent house. Does that mean that a permanent house is better than a grass house? Certainly not. It's that my friend's taste is for a permanent house while mine is not.

In our society, Dan is a good fisherman, hunter, dancer, gardener, painter, carver, potter, builder, etc. He specialises in some of these things and, naturally becomes extremely good at them. He is good with both his hands and head. Generally, he is a good village handyman. The things he does and produces, although they may not look good to others, are valued very highly by himself. He learns to make these things by practice, through interest, initiative and personal pride. He is happy and contented.

Because he puts his faith and pride in these things, he naturally respects them. His respect goes beyond his things to people around them. This respect or good consideration for others, is part of them. If, on the other hand, there is interference from others, then one will expect some forms of nasty reaction. They've got to be nasty, as the man values his creation a lot more than you and I would imagine. He could go to the point of killing in order to protect his values and pride. Who else can do otherwise?

What I have tried to say so far is that Dan, an ordinary man, is a proud man, interested in what he is doing, is self taught in the sense that he never attended formal classes in the things which he does, has initiative and a spirit of competition to do better than others. He values his skills, workmanship and related issues more than anything else.

He will do his best to protect his values; sometimes to the extreme of causing others harm, although he would not normally do that if his values were not interfered with.

You may ask: "What has that got to do with my topic for today?" If I were there with you I would have the same question to ask. Before I get to the point, I would like to discuss what a lot of people in rural areas (and urban too) consider as education.

Education, to many of our village people, would appear to be going to Primary schools to learn the basic four Rs (Reading, Writing, Arithmetic and Religion) before he moves on to a high school or other institutions, which includes our universities. This would mean that when Dan has completed his studies, no more will be carried out, except for him to get a good paid job. His parents would then expect parts of the salary for their food and clothes. And there's were it ends.

What does Dan thing about education? Well, he thinks that at the end of his primary education he will go on to a high school. That happens. When he has been at a high school for a few years, his interest goes beyond his earlier expectations. He naturally wants to have a good job with a good salary, but he becomes more understanding. He probably considers himself to be a very fortunate young man, more fortunate than the majority who dropped on the wayside. These would be the failures commonly known as dropouts. He obviously sees problems beyond what his parents know, on a national basis. He wants, and is prepared, to assist in solving some of the problems. He wants to be involved in all affairs, possibly to be recognised for his effort. He is a nationalist, and is interested in helping to shape our nation. He is a prize winner, a man with prestige, privilege and a leader.

But Dan is only one—he is one out of 3 or 4 young boys who go to schools in this country. Where are the others? What happens to them? How do they feel? Who is responsible for their feeling? What will they cause as a result of their unsuccessful effort? Should other people worry about them? If so, why should they?

Let's follow these people. In their early primary education, they go to schools. Not feeling to be left out, they join the group. They have no real interest but they want to be in a team—a team of a special group. Their parents want them to be in this team just like Dan's parents and so they are encouraged to go to school every day. When they return in the evening, the parents are curious to know how they get on at school, whether or not they get all their sums right, whether or not they make any new friends, whether or not they were kind to others, and whether or not they win any sport in competition.

The children talk at some length about their involvement in school activities during the day. The whole atmosphere there is happiness about the school.

Towards the end of the year, many things, such as sports, are put aside. This is done so that there is ample time for private studies, practice in past and model examination questions organised by the Standard 6 teacher. They become more worried than before about *the* day which is approaching very quickly—the day for the Primary Final Examination.

Soon it comes. They, although concerned about examinations, are confident that they will do well after so many months of examination practice. Everyone is ready in the classroom. There are no other papers around except a stack of parcels on the supervisor's table. The teacher is not around.

The classroom looks strange, it looks bare and becomes quiet. It is not like an ordinary school day. The children feel uncomfortable. They start to worry about the papers on the table. Many questions come through their minds, but disappear as quickly as they come. Then the papers are distributed. The supervisor tells them to look at the papers and, after ten minutes, they may start answering the examination questions. They look through the papers very quickly and find that the practice they carried out in the last few months are different from those in the paper. This adds to the confusion. They start answering the questions. They struggle along. Then they stop. The supervisor collects the papers and tells them that the results will come out in a couple of weeks' time.

In the meantime, the children are both worried and confused. They are not sure that they will pass but since they have had a lot of practice in those months, they feel that they have some hope.

The results come out and, alas, the children are just below the pass mark. They have been good young people but the marks show that they have failed because they are a few marks below the pass mark. Does that mean they are not good enough students? Immediately their heads are full of worries. The parents become annoyed that the young people have missed out after all these years—those wasted years. They missed the initiation ceremonies in the village, they miss the period when they should learn how to make gardens, build houses, paint, draw, carve, dance, etc. The ones who do not go to school and of their age are gradually becoming experts in village customs because they learn these from their parents and people around them. Disappointments arise. They feel that they have no place in the village because they cannot perform the things their age group can do. They know that they are considered by the village people, particularly the parents and relatives of those who pass in the examination, as failures. They are now dropouts, rejects, defeated, hopeless, useless and miserable. They want to leave. But to where? To some lonely islands? No, because they do not know how to paddle a canoe since they are away in school when the other children of their age learn to paddle. Will they go to the bush? No, because they do not know the kinds of edible leaves, roots, grubs, etc., which their friends can easily find. They do not want to stay in the village as they find it hard to fit in there. The only place to go to is the town or city. They have heard about the opportunities for employment there. The towns have good things such as taverns, electricity, sporting facilities, theatres, dances, etc. So they go there.

As they have no practical experience in such things as clerical work and as there are no vacancies, they cannot find jobs. No jobs means no wages and this means no money for food and clothes. There is lack of accommodation. They look around for some people, preferably from near their home, to spend the nights with and to eat from while they continue, with little success, to look for jobs. They become permanent at being applicants. In other words, their job is to find jobs. Their friends, although very helpful to them, cannot bear the cost of food any longer and tell them to leave.

They become so defeated and there grows a new seed of resentment and hatred against everybody around them—their "friends", teachers, schools, the school selection systems. They feel that they have missed out. To them and their people, all these problems are from nothing else but the results of school. Had they not been at school, they would still be at home, living like those who do not attend school. They start to blame their parents for sending them to school. They also blame themselves for deciding to go to school. They ask: "Why did we go to school? See what the school has done for us? We are dropouts, rejects, defeated, hopeless, useless and miserable. But why should we? There is something wrong with the education system. Yes, and formal education for what? It is for the failures like us, for the few, the privileged ones, the prize winners and the lucky ones. What about the other two-thirds? What are they going to do? Be like us? Formal education to us is really to pass examinations. It is to disappoint the young ones, to encourage them to become discontented, rebels, trouble rousers who end up in gaol. Some people think that education is to help us to earn a good living and live a useful life but this is not so. We may as well form a gang to revolt—revolt against the system. We do not worry if we hurt someone because we are already hurt. We have to share this with others. Why should the "prize winners" get away with all these? They will have to share our "prize", that is, of disappointment, with us."

And so they do, and they are glad to see this. They do not respect anyone any longer. Everyone is a crook.

They, on the other hand, want to see some educational changes made to suit this country. They consider that their views would be very important, as they are the ones who suffer. They consider that views from authorities may be artificial because officers of the authorities did not go through the problems. Officers are not dropouts—in fact, they are some of the prize winners. How could the prize winners help?

Before they come up with their views, they have to answer these basic questions:

> Is there a need for schools here? If yes, should they continue to encourage formal education?

After considering all aspects, they come up with the following, which they pass on to the education authorities for consideration and implementation:

(1) Immediate introduction of a village based education system, basically, literacy, with minimum assistance from the government.

(2) A six year primary programme based on practical activities relevant to living and working in the rural or urban community.

(3) Raise entry age to 8 or 9 years plus.

(4) As schools cannot create jobs, it is important that high school education be based on manpower requirements.

The boys feel that if the authorities go ahead with the basic suggestions above, they believe that things should be better. Young people will be happier because they will not be regarded as school dropouts but as citizens who will contribute usefully to our growing nations. They will be living useful lives for which they are educated.

COGNITIVE DEVELOPMENT AND THE PAPUA NEW GUINEA EDUCATION SYSTEM — SOME FINDINGS

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In the final analysis, education systems are concerned with changing the behaviour of children in ways considered "desirable" by each particular society. These changes — in terms of knowledge, skills, attitudes and values — are related to the goals, aims and objectives of the society itself, or at least to those of the people in government who are made responsible for the development of the education system. Attainment of the goals depends on the structure of the system, on the access of children to it, on the funds available, on the skills of teachers, on the curriculum and on a host of other variables.

Not least among these other variables are the capacities of children to learn. Even in the most developed of western societies, we still do not know as much as we should know about the ways in which children learn, nor about the factors which affect the probability that they will learn. Still less — far less — is known about the effect that different cultural backgrounds have on learning. We do know — although we often ignore — that so-called western techniques of curriculum construction, of teaching strategies and models of learning are often inappropriate in other societies. We also know — to our cost — that to "copy" western models often leads to ineffective learning.

A great deal of research is needed on the ways in which children learn in different cultural settings. This research is absolutely crucial if developing countries, like PNG, are to develop education systems which will enable children to develop their potential in order to grow and mature as individuals and, at the same time, the needs of their own societies. Our concern over a number of years has been with research about children and their education.

Typically, educational research about children proceeds in three major stages. The first is concerned with identifying and, if possible, quantifying the characteristics of the children as they are in a given situation or society. The second relates these identified characteristics to casual circumstances. The third stage ideally puts into classroom practice the knowledge so gained so that the teacher can intervene successfully in the child's development in order to influence learning in ways desired by the society.

A fourth evaluation step may be introduced to assess the degree to which the teacher has succeeded, although this is not research in the sense in which the term is used here.

Far too often the third stage is magically produced without the preceding two and is "evaluated" by the magician — or the magician's apprentices — purely as a post hoc substitute for the reasoned observation and experiment which the magician scorned to use. The armchair curriculum expert, who guesses first and measures last, is far too common in education history. It is no wonder that the physical sciences look with some disdain and no little suspicion at the pseudo science of the social scientist, including the educator. This paper draws particular attention to child development in Papua New Guinea, where one specific area of stage one — identifying some of the relevant characteristics of children — has been carried out and enough of stage two completed to foreshadow a viable form for stage three.

So far, the bulk of the work has been carried out by staff of the School of Education of Macquarie University. The next and most crucial stages can only be accomplished by Papua New Guinean nationals. This is not intended to imply that the work in the first stages has been exhaustive. Indeed it leaves a large sweep of development untouched. In addition, analysis in depth and breadth of the second stage is still proceeding and will hopefully provide more and more insights for designing intervention techniques. Yet enough has been achieved to indicate some valuable classroom practices for the early years of school and these can be tried, evaluated and the techniques modified while other analysis is being continued. We would emphasise that many of these practices would be quite different from those in, say, Australian classrooms. The area of investigation with which we have been concerned relates to the ways in which children learn to think. During 1972 it was broadened to include the relationship of current classroom practices to this learning and also the effect of the child's belief in his ability to master the environment on his success in actually doing so. The analysis of these two sections is not yet complete, although there are indications, both from them and similar studies, with non-English speaking migrant children in New South Wales, that the attitude area may be an important key to the general problem. What the present authors would like to argue stems from a section of the analysis which implies the desirability of the trial of a number of classroom techniques in the first year of school.

One of the aspects of this area is concerned with the relationships of classes of objects to other classes of objects, particularly with the formation of "nesting hierarchies". In English, for instance, the term "human" includes man and woman; "mammal" includes humans, cows, tigers, etc.; "animals with backbones" includes mammals, reptiles and fish and so on. We are not concerned with tthe *content* of the classes. In PNG, however, one Highlands people group birds and tree-dwelling marsupials together as "animals which live above the ground", while another groups tree-dwelling marsupials with rats and other small creatures as "small four footed animals". Each is an equally valid classification. What is important is not the content but the way in which the classes relate and become more inclusive.

We must digress at this point for a moment and consider the importance of this aspect of thinking against the totality of possibilities. There are heartening signs recently that Papua New Guinea is attempting to design an education system for her own particular needs given the economic, political and human facts of life in this country rather than to persist with an imported, superimposed Australian system. What form this new design will take remains to be seen though we wish the attempt all the success it deserves. In such a design, the relationships of classes to each other may not be very important in the education which will be offered to the majority. Yet the hard fact remains that a significant number of Papua New Guineans will need to be trained to service, build and re-design the products of western European technological thinking. There is considerable correlative evidence for, and none against, the proposition that this training implies an ability to handle the form of logical classification relationships and implications which are characteristic of western European thought. For a significant number of Papua New Guinea children then the acquisition of western-type thinking skills will be important to their country.

To return then to our classification example. This is by no means the only area of cognition that we have examined in Papua New Guinea, nor is it the only area important to the developmental skills of western technology. It is, nonetheless, a *basic* and necessary intellectual skill and serves as a good illustration of our argument. For some years past, the education system has tried to teach western classification skills by means of set theory in mathematics, using wooden attribute blocks. Admirable though the intention has been, we would argue that it was doomed to failure because it begins with a system of classification alien to the child. All the Papua New Guinea languages we have so far looked at have their own classification systems, as indeed do all human languages. The Papua New Guinea child, like children everywhere, is not consciously aware of his own vernacular system. To confront him with an alien system before he has even mastered his own seems to be the height of folly. This conclusion is borne out by the fact that village children, with no school experience, perform significantly more efficiently than school children, at least to the end of standard five, on tasks where one would expect the school child to have an advantage. By this time, it must be remembered, there has been a material loss of school children who have left for a variety of reasons, among them being failure.

A further example of the inefficiency of starting teaching at a developmental point which the children have not yet reached comes from our 1973 follow up investigation with secondary school students in the west Highlands. The majority of Form 3 tested had trouble with problems involving area. Australian children have trouble in this way also, but by secondary school age, one way or another, most of them can handle the concept. The Highlands children were being taught by methods which work (more or less) in Australia. But the Australian child, one suspects, comes to school with a concept of area which however rudimentary is also that of the school. The rural highland child on the other hand brings his own people's concept with him. Area of gardens is very important in the Highlands society for status and many other reasons. Unfortunately, the rural concept of area is not the same as that of the west European concept required by the school. Highlands gardens are typically measured by rope or bamboo units along two dimensions irrespective of shape. True, the eye is used to equate surface where possible, but when measurement is used "area" is, in effect, "half perimeter". Since the school problems involved measurement, the children tend to confuse perimeter and area. We would argue that this confusion would not arise if the children were initially encouraged to use their people's system and were allowed to work out *themselves*, using concrete materials, that it was invalid for calculation.

The pilot study which led to this hypothesis was carried out with 41 third year students at Mt. Hagen High School. Twelve, selected at random, were given the opportunity to work out the system for area measurement used by their own people in terms of the formula taught by the school. All succeeded in showing mastery of the school concept of area following on this teaching/learning experience, though none had succeeded before the teaching session. None of the remaining 29 was able to demonstrate command over the "western" concept of area.

What sort of intervention techniques do we suggest then, using our example of classification skills? First, that the vernacular groups be delineated. This is surprisingly easy once the concept of what is needed has been gauged. Groups of students at Holy Trinity Teachers' College, Mt. Hagen, in July 1973, worked out the classification systems of three vernacular languages and Melonesian pidgin in one week. We suggest that children in their first year of school be taught to become aware of the classification system of their vernacular. This can be achieved with domino-type games and card games of the "Happy Families" type, using materials made up by teachers themselves — or by teachers' college students as part of their training. The drawings (for the domino-type games, for example) derive from the local scene. In the melpa area, for example, one "domino" set of double pictures might consist of A/A; A/B; A/C; A/D where 'A' is a picture of a particular leaf vegetable (e.g. Kim Kimpi) and 'B', 'C' and 'D' are pictures of other leaf vegetables (e.g. Kim Pompa Kel; Kim Pompa rup; Kim Kun Kund). They can be duplicated on a Gestetner and the glued on cardboard and have colouring done by the children if preferred. The important point is that the children become *conscious* of the system inherent in their own language and culture. Then the games can change so that non-cultural, alien objects are substituted for the culturally familiar objects of their own system, but *still* in the same class inter-relationships. Now the stage is set for a shift to other kinds of inter-relationships using both familiar objects re-classified and alien objects such as form the content of a great deal of the curriculum.

We have mentioned classification as an illustration of our point. As stated earlier this is only one intellectual skill, even though it is a basic and important one. There are numbers of other areas where implications can be drawn for the education system of Papua New Guinea. These have been reported in papers and articles elsewhere and can be traced in more detail through the bibliography. We would, however, like to note briefly other areas which seem critical and which derive from our basic research —

1. Content should be presented in a form which can be easily coded as a pattern, rather than as a set of symbols.
2. Intentional effort should be made (probably by the use of cognitive conflict) to move children into easy use of symbolic coding.
3. Where "hangups" exist between the local vernacular and the language of instruction, these *must* be taken into account by the teacher in his programming.

To conclude, we are arguing for the implementation of stage three: intervention based on research related to children and curriculum. There is enough evidence from research to begin to try out classroom techniques so that these can be evaluated and objectives modified where necessary. This is not to say that we should not expand and continue work in stages one and two. But the object of educational research must not be merely more research. Further, the application of our findings can only be carried out successfully by Papua New Guinea nationals working in the field. We make a strong plea for this to begin — NOW.

19th February, 1974

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MONITORING EDUCATIONAL DEVELOPMENT IN A FOREIGN CULTURE—SPOTLIGHT THE PROBLEM AREAS

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THE QUALITY OF EDUCATION IN PAPUA NEW GUINEA

Teaching practices at the moment may tend to be ineffectual in the development of intellectual skills in Papua New Guinea students.

There are suggestions from recent research work in Papua New Guinea that there is an emphasis in our primary schools on rote learning leading to low transfer and that the general effect of primary schooling is to decrease a child's competence in thinking skills.

As part of a concern that children should learn something more than rote application of procedures in Mathematics, attempts have been made since 1964 to test pupils' comprehension of mathematics in the standard 6 (primary) examination. A report on the 1970 examination made the following comments:

> Questions that were difficult for candidates (i.e. approximately less than 40 percent of candidates were right (on four choice, multiple choice questions)) suggest candidates have difficulties with items
>
> —testing understanding of decimals
> —testing operations in percentages
> —testing operations involving fractions
> —testing understanding of weight measures
> —involving verbal material, particularly where the solution requires more than one operation
> —of unfamiliar content or format (Donohoe, 1970).

This suggests that ability to apply concepts or even basic understanding of mathematical concepts is being poorly developed in primary school.

Southwell concluded that negative effects of rote learning were observable in Mathematics with indigenous teachers and pupils in Papua New Guinea (Southwell, 1972, p. 319).

Kelly found that unschooled children in Papua New Guinea were significantly superior to a matched sample of schooled children in particular methods of using information in one type of problem-solving (Kelly, 1971, c).

Beck assessing a sample of primary pupils representative of the Standard 6 population in 1963 found that many Papuans and New Guinean Standard 6 pupils had an inadequate concept mastery for the studies required in their Social Studies syllabus (Beck, 1965).

Preliminary analyses of research by Spearritt (1968) suggest that vocabulary development and command of sentence structures (language concepts) are the most important variables affecting Papua New Guinea pupils' performance in the four major communication skills in English. Spearritt's research statistics could only show the relevance of mastery of sentence patterns when a fair proportion of pupils did not have this mastery.

Examiners' comments on secondary mathematics examinations suggest a similar underdevelopment of basic concepts:

> lack of understanding of the meanings and relationships between square root and square . . . no concept of metric weights . . . meaning of negative indices not understood . . . a need for estimation of answers to avoid such a ridiculous answer . . . a simple test of the meaning of the set not well done . . . a lack of knowledge of the meaning of an equation . . . many students omitted the X indicating a lack of understanding of its meaning in this case (Burdett, 1972).
>
> Students preferred the easy or obvious way rather than consider the operations involved . . . did not know where to put the decimal point . . . teachers are not placing enough emphasis on approximation . . . many candidates had little idea of gradient . . . many confused area with perimeter . . . on the whole most mistakes were made in selecting a characteristic—in other words understanding of basic principles was lacking (Whitred, 1971).

The Chief Examiner's Report on the secondary school certificate examination in Geography 1971 notes

> A general weakness in the lack of a basic understanding of the geographical fundamentals . . . (Power, 1972).

Mackay developed a test of scientific concepts. His conclusion was that Papua New Guinea Form IV students

> "are performing at a level somewhere between the levels of performance of Victorian students at the end of Form II and the end of Form III" (Mackay, 1968, p. 12).

Concept development in the new secondary Social Science course is likely to be inadequate. Ausubel's theory suggests that the development of broad concepts is a first learning task, with the development of finer discriminations a later one. The Primary Mathematics course has attempted to develop concepts in this way, teaching the global term "set" in standard I. However the Social Science course has not only failed to build a structure into its course but there has been no systematic planning of concept development in each unit (Whelan, 1972, p. 26).

Price's (1973) findings—the underdevelopment of Papua New Guinea University students' reading skills and command of vocabulary—indicate that language concept weaknesses persist right through the educational system. Jones (1972) has attempted some analysis of reading comprehension problems at tertiary institution level.

Items requiring fine discriminations in meaning, including the following words as key elements, had a success index of 50% or less:— "as a consequence . . .", "class includes", "contradictory", "essential", "excluded (the possibility)", "not all", "simultaneously", "some".

Words such as "contradictory", "dominant", "implied", "significantly" indicated vocabulary as one area of conceptual difficulty. Difficulties in two other broad areas, conditionality and in sentences involving relative amounts indicated students have difficulties with sentence pattern concepts:

> relational concepts are translated into absolute terms . . . take the item 'The population of the area has shown an increase.' Between 30% and 40% of the first year tertiary students (approximately Form V level) responded wrongly to this item; the popular wrong responses were:
>
> (a) The area is now densely populated
>
> (b) There used to be very few people living in the area, but now there are many.
>
> (Jones, 1972).

A generalized command of formal logic is reached by about 53 percent of standard 6 children in schools in New South Wales in Australia, and was reached by 16 per cent of a sample of Greek immigrant children in New South Wales (Kelly, 1973, p. 15). There is considerable doubt that adults in Papua New Guinea villages ever attain this conscious command of formal logic and there is evidence to suggest that few Form IV students have such a command of logic (Kelly, 1971 (a); Prince, 1969, p. 126; Prince, 1967).

> "The age level for achievement of formal operations is fairly well established in the western scene, between fifteen and seventeen years of age. It does not seem to be clearly established in the non-Western scene and it is difficult to know how much delay to allow as compared with normal Western development . . . In fact evidence from the University Preliminary year (approximately Form V) suggests most of the students can reason with concrete objects, but find abstract reasoning altogether too difficult. Abstract reasoning and propositional logic would therefore present almost impossible difficulty in the high schools . . ." (Prince, 1969, p. 126).

Such weaknesses in command of logic and concepts are apparently adversely affecting the ability of Papua New Guinea students to study academic subjects (Mackay, 1968; Mackay, 1969; Mackay, 1970; Mackay and Putt, 1972).

EDUCATIONAL TESTING AND PROGRESS BEYOND THE STAGE OF FORMALISM

However it is not the current low level of educational and intellectual development that is the main concern. Rather it is the difficulty of breaking out of this state of affairs. Educational testing practices may be significant in various ways in disturbing the tendency of the Papua New Guinea education system to consolidate at the stage of formalism as so defined by Beeby (1966). Test writers and teachers will need to identify the sources of intellectual weaknesses in an attempt to overcome them where possible, through making available to teachers specific information from tests on students' specific weaknesses.

A first priority for test writers concerned with public examinations is to ensure that examinations do not test trivial knowledge. The problem is more difficult than might appear for a test composed wholly of higher level educational skills that were not being developed in students could not be used to discriminate between students in an external examination. Nevertheless an attempt must be made to lift the type of intellectual skills being tested, for if testing is related to low level performance, teachers will be encouraged to teach what is of little significance.

A second way in which testing practices may contribute to improved teaching is by providing teachers with definite ideas on specific teaching goals through the provision of tests of pupil performance in particular subskills to be developed in various units of a course. Specific purpose tests of this type have been nominated "mastery" tests (Wilson, 1970).

Mastery tests on units of syllabus work, testing understanding of key concepts, scientific models, and specific problem-solving approaches may be useful for the purpose of improving teaching and learning efficiency.

The use of Mastery tests for each of the various subjects may also help by including items that make gradually increasing demands over a number of years of the course on a student's ability to use logical argument and on his ability to interrelate sets of ideas.

For example a particular weakness—by Western standards—is noted in the way Papua New Guinea children develop categorization skills, and the way the Papua New Guinea cultures have built their own system of concepts. Unschooled village subjects in Papua New Guinea do not show a clear developmental trend in strategies for sorting objects—towards the use of super-ordinate categories (Huntsman, 1973). Apparently Papua New Guinea cultures can be compared with those of rural Mexico, rural Senegal and Eskimo villages where the differences between objects are more significant in those cultures than their similarities (Bruner, et al., 1966).

Simple non-technical cultures like those of Papua New Guinea may develop a resistance in members to developing concept hierarchies by insisting on attention to perceptual differences.

> "Folk taxonomies so far reported in Papua New Guinea consist essentially of rather shallow hierarchies of named categories ('taxa') with each largest named category (primary taxon) either lacking internal division in the case of creatures or plants of little interest or importance or having one, two, or occasionally more levels of internal division. No general categories corresponding to 'animal' or 'plant' have so far been reported and like many former traditional European folk taxa, primary taxa in New Guinea societies seldom correspond well with scientific taxa . . . on the other hand as one moves down the taxanomic hierarchies many of the lower-order taxa do correspond well with scientific taxa" (Bulmer, 1971).

The aim of schooling is to develop in children a distinctive hierarchical structure of concepts because it is only in this way that a child can acquire sophisticated intellectual tools. Tests should be developed to monitor students' progress towards such a mastery of interrelated concepts.

The intention in producing and distributing such tests would be to negate depressing cultural forces on the development of concepts and logic—but not to attempt to accelerate logical development in the way that Piaget (Phillips, 1969, p. 132) suggests is impossible. As Gay and Cole point out (1967, pp. 90-94) the Kpelle (African) child who asks "why" is traditionally beaten for his curiosity; attention in school to the teaching and testing of the development of ideas and of logical thought in the child should encourage him to ask, "Why?"

THE USE OF MASTERY TESTS IN SCHOOLS

When and if tests of concepts and intellectual skills are used or made available to teachers, it is likely that a large percentage will find difficulty in defining such skills as educational objectives and will have difficulty in devising lessons to develop such skills in their pupils. For these reasons the introduction of mastery tests into Papua New Guinea schools may prove a difficult innovative task.

Average teachers in Papua New Guinea trained to follow set procedures may be reluctant to try anything they have not been thoroughly introduced to through either pre- or inservice training.

Even when they do use mastery tests, they may fail to appreciate the specific inadequacies of cognitive development in pupils who do poorly on tests of concept mastery and problem-solving ability.

Such teachers may find it impossible to free themselves from set patterns of teaching (the Minenda sentence pattern drill for day two week thirteen is . . .) to include special periods for remedial work. They may be unable to make the necessary adjustments to their programme of work when such special teaching is included, may be unable to organize the class into different groups during such lessons to provide, for example, for those students who don't need extra teaching, and may be unable to devise successful teaching strategies to overcome particular weaknesses of pupils.

The test writer will do no harm in providing mastery tests for such teachers in the primary schools. The very worst teachers may not use the tests or may give the tests to fill in time. The next level of use would be where the teacher taught the actual items. For poor teachers this may be no worse than what they would otherwise do.

Any more professional use of the tests, above this level, should at least provide the teacher with insight into the nature of important educational objectives and some information on how successful he is in achieving them. Only a small minority may use the tests in the way that is intended-providing information that can be used on pupil development in important cognitive objectives. The gain would be both for those pupils and teachers using the tests to the maximum of their usefulness, and to the educational system more generally as teachers colleges, inspectors, and curriculum advisers work to update the professional competence of other teachers through training in the use of tests.

THE QUESTION OF THE VALIDITY OF FORMAL EXAMINATIONS

Provided test writers use an adequate model of human intellectual skills they have the possibility of developing an adequate specification of item types to test problem-solving behaviour in any area of interest. The problem that does remain in that of determining whether any given set of items really do meet the item writing specifications for the skills it is desired to measure. That is testing problem-solving behaviour involves two tasks. The first is providing an adequate model of problem-solving skills. The second is developing items that test particular mental skills defined by the model. This second achievement will more frequently be proved only with the development of tests for restricted use in educational testing.

Examinations inevitably must be produced each year for the Form IV and standard 6 examinations. Items will only approximate to measures of the skill objectives, varying with the competencies and judgments of the test writing teams. There is no opportunity to refine and prove these instruments through factorial studies. This is probably of less concern when the purpose of the examination is merely to give some global estimate of a student's achievement in a particular subject area, relative to his peers.

It might be possible to develop formal examinations which were factorially purer measures of various mental skills and which could give sub-test scores on such skills for more effective selection and prediction. If countries in the South Pacific pooled their resources it might be possible to produce tests for annual examinations that gave valid and reliable measures of particular skills of a quality usually only obtainable when money is being spent on a test for restricted use by a cadre of professionals.

This pooling of resources could involve testing personnel in the various South Pacific countries organized or assisted by staff from the Australian Council for Educational Research and/or the New Zealand Council for Educational Research. Test development work would have to be spread over two or three years preceding the year in which the test was to be given.

For example it might be considered desirable to develop educational tests that tested students' ability to use the full range of formal logic in problem-solving.

An ability to use ratio and proportionality with understanding in the solution of problems is believed to require such a command of formal logic. A study was made of the inter-correlations between performance on a test of 10 items based on proportionality and performances on first and second semester examinations for preliminary year students at the University of Papua New Guinea in 1972. The factor analysis showed a stable factor, identified with ability to deal with proportionality, as a key factor in determining academic success (Jones, 1973).

From this study it would seem that Preliminary year lecturers assume it is necessary for students to learn at the formal operational level (as so defined by Piaget, Flavell, 1963) and are giving their lectures at this level. If this continues to be the case, selection examinations such as the Form IV school certificate examinations ought to include proportionality items in the various subject tests as tests of the achievement of the stage of formal operational thought for any desired improvement in the validity of the examination for prediction of success at tertiary institutions—presuming students can be discriminated on this skill.

One reservation needs to be made about attempts to improve tests in this way. The temptation is to believe that the main problem is the development of tests that have superior power in predicting, for example, success at the university. This may be looking for the end of the rainbow. It is possible few students have a significant development, or variation in development, of the skills measured in the test. It is also possible that the particular faculty at the university to which the hypothetical high powered thinker is admitted has courses that are poor and tedious, by criteria of cognitive learning theory, for developing students' mastery in subject areas. When and if such courses are offered it is plausible that superior students would show a greater drop in motivation than poorer students. Teaching itself is an independent variable that could be expected to produce variation in student achievement in addition to that predicted by a student's earlier achievement. The evidence of a high relationship between psychological test scores and results of preliminary year University results (Ord, 1970) can be interpreted as suggesting that teaching in the preliminary year is of a low effectiveness (Wilson, 1970, p. 27).

Conditions, outside the control of the test writer, reduce the predictative power of tests. It is as likely that the 'right' student or the 'right' institution is missing. Nevertheless with the provision of certain resources improvements could be made to the tests used for selection to obtain purer measures of significant intellectual skills.

CATEGORIZING EDUCATIONAL OBJECTIVES IN TERMS OF CONSTRUCTS FROM COGNITIVE THEORY

What is distinctive about the type of human learning carried on at school must be defined. This can be distinguished from stimulus response learning and configural learning which are basic learning mechanisms lower down the evolutionary scale (Razran, 1971) Gagne (1970) has distinguished Type 7 learning—the learning of complex concepts, models, and rules, and Type 8 learning—the use of more complex series of intellectual activities called problem-solving. There is sufficient agreement on this distinction in the works of other theorists of human learning—Ausubel (1968), Bruner (1966), Piaget (1964, 1971) for these two broad categories to form a first basic classification for test writers (Donohoe, 1974, p. 34).

Cognitive theory points to the following aspects of mental structure as key variables in educational performance:

(a) command of a wide range of concepts.
(b) the psychological interrelationships between concepts in the mind
(c) ability to use ideas in solving intellectual problems and flexibility in trying a variety of approaches
(d) command of various levels of logic associated with various stages of intellectual development
(e) command of specialized problem-solving skills developed through academic study of particular discipline studies.

In each of these areas the educator and test writer need to define the particular learning needs of Papua New Guinea students. By way of illustration the rest of this paper will be devoted to studying particular learning problems of Papua New Guinea students in studying Science. A discussion of the particular problems Papua New Guinea students face in the other areas listed above—in learning concepts and problem-solving skills—is discussed in Donohoe (1974). Copies of this essay have been sent to the libraries of all tertiary institutions in Papua New Guinea.

KNOWLEDGE SYSTEMS IN PRIMITIVE SOCIETIES

It is a fair assumption that children in Papua New Guinea will find it difficult to accept particular scientific models (i.e. systems of concepts with associated rules for inquiry and analysis of phenomena) because the traditional patterns of thinking will be more often simple empirical, associative thinking, of the type associated with beliefs in the efficacy of magic.

> Primitive society . . . is characterized by magical knowledge. Magical knowledge relies upon empirical thought, the only type of thought possible in a society without the mental skills, specialities, and symbolism necessary to develop a rational system of ideas. On the basis of size alone, there is no possibility of a complex division of labour necessary for the development of a rational system. As the society is simple, its thought is simple, and its knowledge consists of a catalogue of means for achieving ends (Magical power) arrived at by the association of empirical observations. The only goals in primitive society are empirical ones.

TABLE—*Knowledge Systems*

Willer, J. *The Social Determination of Knowledge*, Englewood Cliffs, N.J., Prentice Hall, 1971.

Connective levels of thought (p. 25)

(1) Theoretical

(2) Observational

COMMENT

Magical	**Mystical**	**Religious**	**Scientific**
Empirical trial and error methods for practical use; like produces like; things once in contact continue to act at a distance—simple association, no questioning of type of associations; multiple causation as multiple associations (p. 27, p. 34).	End state is theoretic and unitary—an escape from the empirical world (p. 28) not connected to other theoretic ideas — communication impossible between those in and those out of this state about its nature.	A system of connected concepts: Religious behaviour is an attempt to fit the world to non-empirical concepts (p. 29).	All thinking which combines rational, empirical and abstractive thought is scientific (p. 31), e.g. development of scientific theory—set of rational relationships existing when elaborate empirical relationship are connected through abstraction with a set of isomorphic rational relationships (p. 33).

TEST OF KNOWLEDGE SYSTEM			
Practical results. However with acceptance of multiple causation and because there is no way of collecting and integrating associations at abstractive level, new bits of knowledge do not build upon old ones but merely add to them. There are no internal dynamics for improving knowledge system (pp. 27-8).	No test possible. Rationalistic arguments outside this system of thought. And empirical relationships cannot explain the whole of the abstracted meaning (pp. 28-9).	Only tests of validity of conceptualization are direct revelation, mental insights, and the rules of deductive logic (p. 29).	Test isomorphism of empirical and rational connections (p. 33); superior efficiency in explanation and prediction (p. 37).
EXAMPLE			
Witchcraft of the Azande of central Africa (p. 40).	Buddhist conception of the world (early form) (pp. 92-95).	Western Christianity, Mohammadanism (p. 104).	In no society has scientific thought predominated — only visible in sub-cultural groups (p. 105) — e.g. those accepting and using Darwin's Theory of Evolution (pp. 125-129).

ones arising from day to day associations and basic human needs. In a primitive society all knowledge is magical. The modern notion of magical knowledge is just that, a modern notion. To the primitive no other kind of knowledge exists. All thought is empirical, all action is power related, and thus all knowledge is magical (Willer, 1971, pp. 39, 40).

What is missing from magical knowledge, but present in scientific paradigms is a set of relationships between abstract concepts which are isomorphic to a set of empirical relationships (see Table). This gives a theory or paradigm. From the paradigm one can discover which facts or empirical relationships are of particular significance, what tests will show the isomorphism of the rational and empirical relationships and in which direction future research is necessary for the development and refinement of the paradigm (Kuhn, 1962).

Magical knowledge is inefficient being of the form, "A then B", where "A" and "B" are particular empirical terms. Neither the conditions nor the relationships can be generalized condensed, and integrated so that magical knowledge is a catalogue whose size is limited by the storage capacity of a particular society. This contrasts with scientific knowledge which is extremely economic in form, by virtue of its wide applicability, and of markedly superior explanatory and predictive power (Weller, 1971, pp. 27-37).

Knowledge systems in many traditional societies in Papua New Guinea are known to be just these types of catalogues—finite, and passed down from generation to generation (Bulmer, 1971, p. 28).

Bulmer suggests that the pragmatic nature of traditional (and magical thinking) is likely to result in Papua New Guinea children quickly accepting scientific explanation on the basis of its superior predictive ability. His writing ignores the problem that in developing a true scientific understanding (and not just another "A and B" understanding) the child will have to be taught a new type of intellectual thinking—the learning and use of paradigms; new, that is, in the degree of logical rigour required in the cross checking of abstract and empirical relationships required in ideal scientific thinking. However in this regard the New Guinean child may not be alone—possibly many secondary school children in Western countries do not fully develop this understanding of the nature of science—or are not taught it.

> The contrast between a modern scientist and a primitive is often misleading for only a small number of persons in European societies live even partially scientific lives. It would be untenable to argue that primitive man does not employ the same principles of deductive and inductive logic that European man does. What leads the primitive to magical acts and beliefs is not his system of logic but his errors in correlating irrelevant causes with partcular outcomes (Lessa and Vogt, 1965, p. 34).

It is possible secondary students in Papua New Guinea still hold to such a magical view of knowledge. Students in Forms 3 and 4 were found to have more positive attitudes towards natural scientific control and manipulation of the environment than villagers, but they tended to underestimate what in fact were the attitudes of minimally educated villagers, and were lacking in a truly critical outlook themselves (Maddock, 1973, p. 272, p. 282). This is suggestive that they only—and erroneously—conceive their superiority in scientific thinking to come from their empirical thinking and hence may not have really understood the difference between scientific and associationist thinking.

Education itself may be seen as a ritual initiation into some equivalent form of magical knowledge, which is possibly the way the older villagers regard it:

> The Abelam community near Maprik in the Sepik District of Papua New Guinea see modern education as a means for man to achieve greater influence over his changing social and physical environment. But in what way . . . I do not know.
>
> One councillor said to me recently that the (primary) school at Balupivine is like "Ulketagiva" a ritual for small boys, the high school in Wewak like "Kutagiva" a more important and exciting ritual, and the University like "Buti" . . . power . . . from association with the ritual objects of the most powerful tamberan . . . (Neve, 1971).

It is not impossible that students could complete secondary schooling without grasping the essential nature of scientific thinking, given the type of knowledge systems primitive societies construct. Testing of scientific thinking therefore should be addressed to the particular intellectual activities that are unique to scientific thinking.

PRIORITIES IN TESTING SCIENTIFIC THINKING

One of the fundamental issues in testing scientific thinking, therefore, will be the testing of students' understanding of paradigm construction as a way of interpreting events in an economical way. What is to be tested are the students' understanding of, and even skills in, the formulation of models and propositions, the derivation of hypotheses for empirical testing, and the use of hypotheses to prove and improve a model.

Another objective that ideally would be tested is the student's ability to formulate a problem for scientific testing and to plan and carry out an appropriate investigation. The test would provide information on the student's ability to free himself from arbitrary dogmas (which, ideally, science is not) his ability to make critical judgements from evidence and his ability to detect misinformation and the extremes of belief (Schwab, 1973).

ITEMS TESTING SCIENTIFIC THINKING

The following two items appear to test students' general understanding of the task involved in model construction:

> One model for thinking about electricity is to think of a battery or generator as a kind of pump for electricity, and the conductors in a circuit as carriers of electricity, in which the electricity flows in a similar way to water. This model can be used to explain many observations about electricity.
>
> Which of the following observations cannot be explained by this model?
>
> A. Doubling the strength of the battery increases the current flowing through a given wire.
>
> B. The current gets weaker if the battery loses its strength.
>
> C. A magnetic needle is deflected if placed near a wire carrying a current.
>
> D. The thicker the wire, the more current can flow through it (1973 School Certificate Science Examination).

This item may be categorized as evaluative thinking with verbal material where the answer required is a system—using Guilford and Hoepfner's (1971) categorizations of mental skills.

The following item is also of this type:

> A crystalline solid may be thought of as a group of spheres in three dimensions, each sphere connected to its neighbours by a stiff spring.
>
> The spheres are vibrating in various directions. A number of facts about crystalline solids are given below. Before each fact write the letter of the response that best states the applicability of the model as an explanation of the fact. Note that only one response should be given for each fact.
>
> (A drawing of spheres connected by springs in three dimensions is shown.)

Responses.

A. The fact is explained by the model given above.

B. The fact can be explained by modifying the model as follows: the amplitude of vibration of the spheres depends upon the temperature.

C. The fact can be explained by modifying the model as follows: there are irregularities in the arrangement of the spheres.

D. The fact can be explained by modifying the model as follows: the elasticity of the springs is different for different solids.

E. The fact cannot be explained on the basis of the model, even by changing it as above.

Facts:
Solids contract on cooling.
Solids may be compressed slightly.
Solids do not diffuse through one another.
Solids conduct heat.
Some solids are harder than others.
The speed of sound through steel is greater than its speed through lead. (Bloom, Hastings, Madaus, 1971, p. 612).

This item may be categorized as evaluative thinking with verbal and figural material where the answer required is a system (Guilford and Hoepfner, 1971).

Other question types particularly related to scientific thinking are the following:

A new disease infected toads in an area and caused most of them to die off. The people in the area noted that many more flies than usual were appearing. Which of the following explanations seems to best fit this observation?

A. The decrease in the number of toads feeding on flies allowed the number of flies to increase.

B. The weather conditions were much better for the breeding of flies than for toads.

C. Toads cause flies to breed more rapidly and increase in number.

D. Flies cause toads to stop breeding and decrease in number (1973 School Certificate Science Examination).

This item may be categorized in Guilford and Hoepfner's (1971) terms as evaluative thinking with verbal material where the answer required is an implication.

Type B—to test ability to evaluate hypotheses;
Hypothesis: Young birds can learn to migrate south in the Autumn by accompanying their parents.

Each of the following items states observational or experimental facts.

For items (1) and (2) mark space
A—if the fact or facts tend to support the hypothesis
B—if the fact or facts tend to refute the hypothesis
C—if the fact or facts are irrelevant to the hypothesis

(1) In making the trip from Northern Canada to the Argentine, adult golden plovers fly in groups due south from Labrador, above the Atlantic Ocean, 1000 miles from the eastern coast of North America, thence over Brazil to the Argentine. The young golden plovers fly in groups by way of the Mississippi Valley and over the Gulf of Mexico, thence over Bolivia and Peru to the Argentine. On the return trip the old and young alike take the Mississippi Valley route.

(2) Cowbirds build no nests of their own but lay their eggs in nests of some thirty species of other birds; here the eggs are incubated, hatched and the young reared by those foster parents. When the first migratory trip is completed the young cowbirds are found in the south neither among the thirty different destinations of their foster parents, but instead in one locality occupied predominantly by their own kind.

(3) In the light of the facts given in items (1) and (2) what is the status of the hypotheses at this point?

(a) It is established as probably true
(b) It is refuted as probably false
(c) It remains as much unsettled as at the outset.
(Bloom, Hastings and Madaus, 1971, p. 607.)

The reading difficulty of the above item would make it unsuitable for use in Form IV in Papua New Guinea but the level of logic required would probably be within the capability of many Form IV students.

Such items appear to test some of the general intellectual skills which are the ultimate justification of much academic study of science. For this reason items of these types should appear in science examinations.

PERFORMANCE TESTS OF INQUIRY SKILLS IN SCIENCE

In Social Science, Agriculture, Geography, Technical Studies and Science, students can be assessed on their scientific thinking skills in individual or group exercises, in practical or academic activities. This may allow a fuller investigation of pupils' development of these skills in ways not testable in a short formal or internal examination, and may allow the only opportunity of assessing whether students can use scientific problem-solving approaches.

It may be particularly important to test the development of this skill in a group situation when the information desired is whether the student has developed thinking skills useful for a future specialist or generalist position in the cash economy—or even in the village. For problems technical or general are usually solved by groups.

Where external examination scores are processed on the computer to take account of teacher assessment, as they are in Papua New Guinea, it is relatively easy to give a weighting to such skill in scientific thinking.

The outstanding student will be noticed by the teacher—and given recognition for his superior skill through the use of a teacher assessment component in the final examination score. It might be difficult to pick out such people in a short pencil and paper test. It is more difficult for the teacher to devise procedures to rate all students in the skill. It may be possible to get students themselves to rank each other on scientific-thinking ability. By asking students to rate the best twenty in scientific thinking in each subject area, excluding themselves, it would be possible to recognize students noticed most frequently by their peers as excelling in these tasks—and hence a rank ordering of pupils could be made. The teacher could check the validity of the class's ranking by determining agreement between himself and the class on the top and bottom few—and by determining whether alternative explanations for the class ranking, such as 'the most outspoken' could reliably be excluded.

CONCLUSION

Educational tests may contribute to increased teaching and learning efficiency through the use of tests to monitor achievement of what for the students are novel, uncommon or foreign intellectual tasks. The construction of models in science is an example of an intellectual activity that is unfamiliar to traditional intellectual activities in Papua New Guinea cultures. Currently there is evidence that even some Papua New Guinea tertiary students continue to have a very poorly developed understanding of the nature of scientific activity (Mackay, 1970). Consequently educational testing in science should be addressed particularly to monitoring the development of an understanding of model construction and use in Science. A similar analysis of learning problems in learning concepts and thinking skills should be used to plan the development of tests in academic subjects to maximize the usefulness of these tests.

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SOUTH PACIFIC EDUCATIONAL RESOLVE
(S.P.E.R.)

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South Pacific: Identity

Like the indigenes among you, I was born, bred, educated and have lived in the South Pacific all my life.

Like many among you, I am a parent in a family that was born, bred, educated and that have lived in the South Pacific all their lives.

Like you, I have only the South Pacific with which to identify. I do so identify; but, as one whose ancestry was washed by Atlantic waters, and whose canoe came but recently — in an historical sense — to these waters.

It is at this point that I am unlike your peoples. Your ancestry in and occupancy of South Pacific waters goes back into unrecorded, legendary, carved and mythically danced history. You who have more pigmentation to your skin are the indigenes; I, with less pigmentation, am an historically recent migrant.

The South Pacific belongs to you and you belong in it. You know it. You in- and ex- hale it. Migrants are learning about it and to live with it. Migrants are still at the stage of exploiting it rather than truly living in and with it.

The impact of the differences between indigenes and migrants has yet to be spelt out in the fullness of their implications. The differences between us — the indigene and migrant — will, I consider, more fully enrich the Pacific when we who are migrants perceive what you have absorbed into yourselves because you are people of the South Pacific; perceive, that is, the meaning to you of your way of life. Time is, for example, one main concept that the masterful technologist is coming to acknowledge as his area of enslavement. Yet, time is a process Pacific indigenes have continually incorporated into their being.

The central arguments of this paper are:

1. There are differences in emphasis and values between the ways of life of Pacific indigenes and migrants.
2. Those values that are accepted by the indigenes as valid and significant to them should be preserved and fostered.
3. In order both to preserve and foster these values you choose to preserve, you must of necessity, I consider, whatever else you do, control and operate the educative processes in your country.
4. In order to be able to live your own way of life at the quality you choose for yourselves, you need to establish, maintain, promote and modify your own educative processes.
5. An educative process can finally be valid only to the extent that it supports and furthers the way of life for which it is designed.

South Pacific: Locality

Going, though not gone, are the days when a migrant raconteur and mythologist such as Anderson(1) could write that:

> "Scattered over 14 million square miles of Pacific ocean islands is a race that appears homogenous in physical characteristics, language, customs, and religion; that other great divisions according to racial characteristics are Indonesia, Melanesia and Micronesia."

Since those words were written in 1928, Hawaii in the northern Pacific has become another state in the United States; and New Zealand, Australia, Fiji, and now Papua New Guinea, countries of the South Pacific, have become nations in their own right.

The last half century has been one in which the peoples of the South Pacific have become conscious of themselves as entities and in which the differences among the peoples of the South Pacific have made of homogeneity a near meaningless concept.

The South Pacific as an area is different from the Atlantic at so many key points of comparison other than by virtue of the natures of its inhabitants, that to list them all would be to digress too far from the main theme of this paper; and to obliterate the chances of rigorous enquiry into the cause-effect relation among some of the more salient of these differences — but here are three:

The Pacific is an area of water, not of land, masses. Water — a sea-way once and an air-way now — has conditioned and oriented the peoples of the Pacific, with the possible exception of Ab- and Eur-australians, from time past. Pacific peoples, cut off as they are from other countries by water, have grown up as self-dependent peoples relative to peoples in European countries. Peoples of the Pacific follow their own ways of life as proudly as any people, but with less fear of, less pressure from, less subjection to proxemia, and with less self-consciousness of the need to prove either to themselves or others that each is a separate and distinguishable people. Each knows deep within itself, without having to trumpet it, that his is and is proved to be a people with a distinctive life style.

Migrants to the Pacific, though still aliens and foreigners, gradually become transanimated by virtue of living here. No pressure is placed on a migrant by the indigenes to yield his European ways, yet by the day and by the generation migrants to the Pacific are unremittingly suffused as Pacific dwellers.

We migrants bring with us our own brand of individualism, class consciousness, which we brandish loudly. We set up, in your land, our school systems and social administration; but as the years pass we see our system bend and buckle in the unremitting waves of the Pacific life styles. What grew up in Atlantic areas is brought out here and is transmuted.(4) It is transmuted if for no other reason than that one can only migrate with a carcass; a structure, a by-product. One cannot bring the process, the source of the product. The roots and — therefore, the living, growing, pulsing source of the product — the process, stay behind in the soil that nurtured them.

Meanwhile, peoples of the South Pacific have their own brands of individualism, factionalism, fragmentation and ephemeralism.(19) These emerge in Pacific peoples as they live their lives, each an accepted and respected person in a large family kinship, and not as a lone individual in a 2-generation family facing daily a competitive, mass, depersonalising technology.

It is just here, with regard to their ability to produce as a technocracy and as a bureaucracy, that the areas of the South Pacific are today compared unfavourably with the peoples of the Western and from the northern hemispheres, some of which peoples also open their commerce with the world through the Pacific.

There follow, it therefore seems to me, three basic questions for newly emerging nations in the South Pacific to ask and reask themselves:

> What do people apply in their lives from what they learn? — and this process I propose to call Education A.
>
> What, in fact, can people teach others? — which exercise I propose to call Education B.
>
> What is the most efficient and effective structure in which Education A and B occur? — which system I propose to call Education C.

Education A:

Each society of peoples has today, as it has had throughout its history, its own way of educating its members. There is for people all over the South Pacific nothing new whatsoever in the concept of education. Elders and revered persons have long been and are responsible for seeing this education carried out. They are responsible for living it, for setting an example. Education and life for them are one.(5)

An educational process of this style perpetuates a way of life, maintains stability in a way of life. It is the most conservative of all personal and social practices, more conservative than spiritual ritual, ceremony or totemism, because it, education, is the process that preserves those bulwarks of social and personal beliefs. Such an educational process makes in a way of life for the strong bonds of belonging among related people. It is the nursery bed for a people's self-concept.(4) It is an educative process that concerns itself with values. It is a pervasive process because it is incidental within and not isolated and pursued separately for clear cut ends. Significantly — and, at first, it may seem paradoxically — it is, therefore, pursued clearly and sought eagerly by each for himself, lifelong and continuingly.

Change imposed on, or denigration to this process of education — Education A — occurs at peril of national disintegration. We have seen the disintegration happen under colonial rule in the Pacific. We saw it at the beginning of the 20th century erode the Maori way of life in New Zealand; we have seen the effects on Australia's Aborigines, which effects are reasonably described as catastrophic for those peoples; we have seen its inroads into the Fijian way of life. You in Papua New Guinea will know whether or not you have averted the disintegrative influences.

When I refer to Education A, I refer to the basic, continuing, lifelong, face-to-face educative process that goes on in each of us — you and me. It is one of the main processes by which we live day by day our way of life, with pride and loyalty; and by which we live life with what for us is order; and by which we live with and grow in the personal strength of our self-concept. Education A promotes in an individual a socially cohesive, integrative approach to the way he behaves, and it does so, I repeat, because it enables each of us to grow as an individual strong in our self-concept. Education A is the process that nations constantly seek to retain or regain and to which its people endeavour to return if it is lost or undermined. Its strength derives from the personal nature of education, from the learning we enjoy from experiences that we encounter within our daily life.

There are within Education A three major components. It is eagerly sought by the youngest; it is reinforced by a battery of experiences within the family, and among families in the community; and it is protracted and infinitely variable for each individual at different stages of his growth, and as a result of his encounters with other individuals. Education A occurs as each of us applies in the context of our society what we learn. Once applied and tested by each of us for ourselves, we are ready to apply it beyond the context of our society, among others. Education A knows only the limits that come from being human, and from living in an environment and from our perception of that environment.

A nation that dismisses or denigrates this Educative Process A, during any stage of an indivadual's lifetime, invites disaffection and confusion among its populace and a delay to its growth as a nation; and, transnationally. Such a nation is held back in its growth by, as we are want to say, "the nature of human nature"; by, if it is a technological nation, strikes, unrest, sabotage, political upheavals. What the people of that nation are in effect saying is that there is within them an unresolved clamour to engage in Education A — in the application by them of what they have learnt and are learning.

There is, you see, within Education A, no sense of under-privilege, or of disadvantage; no need for talk of re-current education; nor talk of compensatory programmes. There are no grounds for thinking in terms of deficit; no need to escalate plans for remedial programmes. All of these negative and intervention concepts belong, if you notice, within the language of the specialised, technotronic, economically — that is, materially — aspiring, but Education A-inadequate, nations. They are concepts that have grown up in the last 100 years, which is nearly how long we have had Compulsory Education — which is not Education A.

Education A has much more to do with people in families than with national systems. It is, that is, education that goes on among people of all ages, from birth to old age, at the family hearth and in their communities — as these are nominated by families and their members. It is education of and by adults — adult education. It is early childhood education — for it begins prenatally and continues postnatally. It is a continuous process as each applies in his life what he learns. It is lifelong in two respects: first, because each of us is eager for learning and for applying that learning; second, each of us is available to assume the role of co-learner throughout life, sometimes being needed by others for our experience, and needed at other times for our creative or divergent solution to an issue that faces the people as a whole.

Education B

We have pursued B a long time and along a narrow path beyond its natural value. We became enamoured of it and invested so much of ourselves and our resources in it. It is Education B — the teaching process, especially that within the schooling system but also a considerable chunk of what is attempted at home — that has considerably supplanted Education A. Today most people think of Education B when education is mentioned. It is Education B that most evolving nations turn their attention, in the belief that Education B is what has given so many western peoples in technologically advanced and organized nations their advantage. This is where confusion has risen. The confusion arises because there is a component of education in teaching and in schooling, but for too long we have failed to examine what that component was. We failed because we had not carefully and logically enough defined what education was.

Cause and effect easily become blurred in this confusion. It is, therefore, a valid and essential exercise for an emerging nation to enquire into the advantages claimed for western style living with the cost in terms of money, energy, direction and emphasis of the school system it has evolved.

In the course of the enquiry, notice the way in which compulsory schooling needs, at escalating costs:
buildings — and ask, "What kinds? What for?"
equipment — and ask, "What kinds? What for?"
teachers — and ask, "What kinds? What for?"
ancillary services — and ask, "What kinds? What for?"

As western and eastern countries begin now after nearly 100 years to: count the costs in terms of money for buildings, equipment, teachers, ancillary services; count the costs in terms of school failures, school drop-outs, disaffection with school by pupils, dissatisfaction with the school's products by employers; count up the immediate and long term effects on the community, they also have begun to look for other ways of developing the quality of education in order to develop their countries.(2) The issues are well-known by now. They include students who have rioted; parents who have set up separate schools, escaped monks who have vociferated personally and in their writings; teachers who have innovated; researchers who have switched from pure — and so-often redundant — to action-research, in their quest for educational reform.

Education B has indeed within it so little that is in fact educative for the individual that it would be better were it to be renamed and divided accordingly into whatever in fact it is — instruction, indoctrination, propaganda, intervention, imposition. Whatever is educative in Education B is so because of what individuals discern for themselves and that they apply effectively in their own lives. It is effective in the short term if it applies only in their own lives. It is effective in the long term if, also, it contributes to and beyond the society of which an individual is a member. It is incidental applied learning that occurs in the teaching process that causes me to retain this item in this category. It is this same incidental applied learning that has kept up the hopes of many millions of teachers — why schooling is so prolonged and why learning is regarded as a slow, tortuous process. If I were to be thoroughly consistent to my own argument, I would refuse to accept Education B and refer to teaching and its Education A component — for that is what Education B is, the Education A component in teaching. But I go on being inconsistent because of the extensiveness of the use of the term "education" when, in fact, it is teaching people are talking about.

Unless it is analyzed and stripped of its pretension Education B remains nothing more than a parasitic appendage that was spawned in an elitist vein to be protective of certain kinds of hard-won and much fought for knowledge; and that was bastardized by a technological age. That age mimicked the elitist vein in desperate attempts to do two things at once: to justify the wholesale exposure of children to a form of mass instruction meaningless to more than 90% of them; and also to aspire to elitist ends and values belonging to earlier centuries, values ill-fitted to 20th century technology.

Education B has so little in it that is educative that it is, in and of itself, a dead and lifeless adjunct to our present way of life. Were it not that the roots of the learning process (Education A) grew and were applied in the family, there would be no way for a school system(8) (Education B) to continue Attempts, it can be noted, to function educatively otherwise than through the family have failed everywhere. They failed in the ancient Roman, Indian and Chinese Empires.(16) They are faltering today in Russia and Israel(18) and, in a different way, in Western society. Education B fails to the extent that it becomes organized and organization-dominated; it becomes, that is, divorced from the nurturant roots of society. The young will sit it out, compulsorily, shake their heads after 10,000 hours of it, discard it and begin to live.

Education B is a clear example of a system created by Man that has mastered Man. Man is now subservient to the system he has created.

A nation that would make it possible for its people to fulfill the self of each of its members places its priorities for Education B low in its perspective. It respects above Education B that:

(a) All people are co-learners. There are no experts in learning, only varying shades of ignorance; there are no other people as wise in experience as the person himself.

(b) The strength of a nation is founded on practices that strengthen the self of the unborn and of those under three years. A nation that overly focusses its scarce resources on primary, secondary and post-secondary schooling, in order to satisfy the yearnings from unsatisfied needs of the young adult and the middle-aged, is a nation aged before its time.

(c) Change for older people occurs most profoundly and effectively for them in relation to their self-involvements with the youngest in society. Children bring themselves up by bringing up those around them, who are changed by bringing up and living with children. A nation alert to the Education A enquiries of and evaluations by young people who have explored and examined and experimented during the first five years of their lives is placed to be a strong and positive nation.

Whatever there is by way of educative process in Education B distills from the climate or atmosphere of the school, that is, from the relationships among people in the school; and these in turn make possible the preoccupation, by younger and older people alike, with study, knowledge, thinking — with, that is, fostering, practising and exercising skills of intellectual endeavour. It is not the knowledge in itself that matters, for that is mere encyclopedic quizzing. It is, rather, the way a human brain sorts and sifts, deduces and induces meanings and properties drawn from isolated facts, relates them, educes relationships and correlates, that is educative. And such assembling and re-assembling — and, too, dissembling — can be achieved by use of a very wide range of materials if one so chooses. The educative in every process emerges for an individual through the quality of the symbolism the individual generates from the learning he does, using the materials and the people of the environment.

A greater educative component could be introduced into Education B if the three major divisions of the schooling system were comprehended and accepted each in its own right. The first two — (a) custodial care of the young in a safe place, and (b) instruction of the young in basic information — are the components with the least educative possibilities. The third — thinking symbolically, convergently and divergently — is where education can begin to emerge in Education B.

Education A In The School System

Education A occurs in the school system as between co-learners, whether of the same age, older or younger than ourselves. It is that brand of learning in which we apply what we are sure about; but, also, when we unwittingly learn from, with and through some one else. Although Education A is likely to be felt to occur most frequently and poignantly as a result of face-to-face interaction, it occurs also from and within fleeting or substantial incidents and from indirect relationships with people.

Education A is an indicator of our readiness to learn. It cannot be necessarily premeditated; and, it is an explanation as to why some learnings make sense to one and not another in some conceptual areas and not others. We do attach ourselves to one person, one teacher, one adult, one contemporary and not to another. We do seek out special people with affinity for us. We do find it easier to learn from or with one than another, to apply what one says or does or thinks than another. Often it is called good teaching, or imitation, but these are simplistic explanations for the highly individual reactions that occur among people, from which we learn and which are the base of Education A.

In practice, Education A is what has kept alive the constant quest for Education B. It, Education A, belongs in the third division of Education B; in, that is, thinking symbolically about the information in Eudcation B. Education A goes, however, far beyond this division of Education B and has, too, a self-learning, original, thinking component.

Education B and the generative component of Education A are mutually reinforcing. The fine edge of Education A is honed as a result of the interplay and the interactions. Education A is ever alert to perceive education in division three of Education B. It is Education A and the relevant components for it of Education B that Beeby(2) noticed and that opened Bruner's(3) optimistic view of the ages at which children can learn if the conditions are appropriate.

Education A is a basic growth process, a process through which each and every individual eagerly seeks to involve himself at tasks that are significant to him at a level at which he can cope and shape to his and society's satisfaction, at his pace and in his directions.

Education C

This third division is necessary in order to draw attention to the other component in western society's provision of "education" that, by its existence, obscures the real task, that of Education A.

This third division is what is known as the State's or the nation's Education Department. That is a contradiction in terms. It simply is not possible to have such a body. It simply is not possible to departmentalize education.

As was noted above, it is possible to categorize and classify and departmentalize knowledge, teaching, instruction, ancillaries, services of transport, examinations, intelligence (C) testing — but that is not education. It is not even in the service of education. It is in the service of custodial care and to facilitate instructional processes, at the best, and intervention, propaganda and inquisition, at the worst.

However, the term Education Department is now so entrenched that it must stay. Because it must stay I describe it as Education C in order to keep reminding us not to let talk about it confuse any talk about education. The edicts of bureaucracy, in the name of education, are not and cannot be educative in themselves and to the extent that they release any educative thought in an individual they cannot be departmentalized.

A change of title would be one way of reducing confusion — but the selection of a name would immediately label the Department. Imagine "Department of Instruction", or of "Imposition", or of "Propaganda". Such titles are too revealing. So a blanket, acceptable, innocuous term is used — and abuse is suffered by the legitimate concept within that term. The abuse takes the form of people regarding education as a panacea, a woolly-edged, airy-fairy something or other, a bit of all things to everyone and nothing too much to anyone. Whereas for me, for you, for every individual, education — what I apply in my life from what I learn — is for me and you and every individual the very heart of me and the sense I make to myself — and others.

Education C — the structural, organized, bricks-and-mortar system and organization that is called The Department, the responsible unit for Education B — is yet another stage removed from having anything significant to contribute to Education A.

Folk Movements In The Pacific

Papua-New Guinea is emerging as a nation at a time in the history of the South Pacific when its neighbours to the east and southeast are themselves re-exploring what education means to them. One of the steps they have taken is to flex their own educational endeavours in a folk movement indigenous to the South Pacific. The emergence and growth of this folk movement from the people, the families, the communities, allow of no force or systematized organizational structure. Wherever one looks — in New Zealand among Maori, or among Pakeha; in Australia among Aborigines or among Eurausiralians; in Fiji among Fijian groups or among mixed European-Indian-Fijian groups — the movement has its own flavour and character.

All are countries where Education B and C had been introduced by a migrant peoples; are countries in which the indigenes liked and benefited least from the offerings of the system. In New Zealand the folk movement began in New Zealand among Pakeha as long ago as 1941, has spread among Maori people to become a national and cultural, silent, social revolution.[7] In Australia the movement began among Aborigines and spread among Euraustralians, where it is now fast becoming an equally silent social revolution. In Australia the spread to Euraustralians was activated, I would point out, by a Maori-Aboriginal tandem partnership.[8]

In Fiji the spread of the concept of a fully fledged Family Education movement with government backing has been achieved through an amalgam of the endeavours of the indigenes of the three South Pacific countries — Maori, Aborigines and Fijians.

Nor have the indigenes of Papua-New Guinea been unaware. As early as 1970 the New South Wales Bernard Van Leer Project at the University of Sydney's Department of Adult Education[9] welcomed a young woman from Port Moresby as Churchill Fellow. She is a person who has the ability to link with others of her people and begin what could become a folk movement in Papua-New Guinea. Papua-New Guinea will, I am sure, have scores — even hundreds, maybe thousands — like her.

The role in this folk movement of those who are migrants to the South Pacific is one of co-partner in consultation as invited from time to time. A first essential for such consultants is always to accept the concept that the indigenes — that is, the folk themselves — shall control their own educative processes. Precedents[10] for such control exist on a broad canvas and the effects on indigenes and communities of having control over their own learning processes are now clearly enough demarcated to be worthy of further examination.[11]

Separatism by indigenes from others is an acceptable aspect of this movement, where such separation is positive, constructive, chosen, agreed to by all concerned, predictable, definitive, competence — and self-concept-building.

Education B is well established and will continue in South Pacific countries. But it will change. A re-schooling process will occur. Schooling is now being questioned for its effectiveness by up to 97% of those who attend school. In particular, it is questioned for its effectiveness to the lifestyle of the indigenes. Those few indigenes who succeed in the system — despite the system — and who hope to succeed in the system and despite the system, can scarcely be expected to do anything substantial to query the system. Deschooling, that is, is not on. Too many have too much invested in the schooling system for nations to deschool. But what is on is re-schooling. The present choices can be lived out and fulminated by the disaffected. The present choices can be fed freshly from new roots in community, family and personal education, which will spread its influences throughout the many stages of the present system and gradually change it.

When all the evidence is compiled the argument for folk education begins to be impressive.(11) The evidence builds on the way in which we learn; on, that is:

the swiftness of learning in the early years, especially the first three, and of those living with the young of these years;
the eagerness for learning in the early years, especially the first three, and the infectiousness of this eagerness among those living with the young of these years;
the renewed desire for learning by those responsible with the young, especially in the first three years;
the personal nature of the learning process.
Education — the application by us of what we learn:
occurs, then, not in age by age divisions, but is a life long process;
begins, then, not at school, but in the family;
continues, then, not for 5-10 years, but also before 5 and after 15;
continues, then, not in a "teachers and pupils" relation, but as among peoples of all ages and combinations of ages as co-learners.

Educationally we are all potential resource source — for others. We replenish our own sources as we interact with, experience and use the resources that others are; and we experience others in and following their relations with us. We, children and adults, learn about, from, through and with others of all ages. It is this inter-personal, inter-actional, relational and observational, this perceptive, this openly functional educative process that the indigenes of the South Pacific peoples together and separately can promote as a major contribution to the world in the 21st century.

The educational formula that has been evolved by tens of thousands of families in and beyond the South Pacific over the last 25 years, has been built around the following principles:

All people, young notably, are eager to learn.
All people, of all ages, involve themselves in learning.
All people, of all ages, begin their learning in and continue their learning through the family.
All people, of all ages, acknowledge the need for and seek resources appropriate and relevant to themselves.

When these principles operate these organizations and administration procedures follow:

1. Any administration that emerges is always subordinate to people, never their master.
2. Those who are affected by policy make policy.
3. The search for Education A begins with the individual learner and phases in administrators from Education B and C as consultants and as resources.
4. The control of Education B and C resources is with the administrators and also with the learners' representatives. There is, that is, an inverse ratio between 3 and 4. The learner makes decision in 3 and the administrator (in his capacity as administrator) makes decisions in 4; and each consults the other at all levels.

Currently one base at which peoples' thinking is being exchanged, at which action is being researched, and at which current folk movement principles are being evolved in the South Pacific, is the Department of Adult Education, University of Sydney. Impetus for the evolution of resource thinking has come from the Bernard Van Leer Foundation of The Hague; the Department of Aboriginal Affairs, Canberra; the New South Wales Directorate of Aboriginal Welfare; and from the voluntary contributions of Te Roopu Awhina Tamariki, a group of 34 Maori Supervisors from New Zealand Family Education Centres and Play Centres.

Arising out of the evolution of that thinking there are now in operation, and under proposal, changes in primary schools. Schools are being set up that carry through the Family Education concept beyond early education.(13) That is one development. The other and more extensive development has been the confidence with which parents who have gained their competence in and beyond the family in a Family Education Centre have continued to support their children at the existing schools, but who have as parents contributed to change in the schooling system.

Epilogue

As a child grows, he learns. We, who grow with growing children, learn. The growth and learning by all in society at our own pace(2) is the strengthening force within a nation proud of its worthy and dignified people, who themselves are proud yet humble about their endeavours and reinformed about their culture.(15)

SUMMARY

South Pacific	: Identity —	(1)	White people are migrants in the South Pacific.
		(2)	The South Pacific belongs to coloured people and they to it.
	: Locality —	(3)	Peoples of the Pacific and the Atlantic live and value differently.
		(4)	The South Pacific has its particular unborrowed contribution to make to education.
	: Transition —	(5)	The transition to a South Pacific educative process is already occurring and has been for a quarter century, silently.

Education A : Is personally what each applies in daily living and thinking — with meaning to self and others — from what he has personally learnt.

B : Is an acknowledgement of the perceptively resourceful ways in which we learn from interacting with "teachers"; is often called intuitive, symbolic, creative or imaginative; acknowledges that we learn by interacting with others, but questions whether we can be taught anything except knowledge.

C : Is the compulsory system of schooling. It has developed as big business and, mistaken for education is called, mistakenly, education. It is, indeed, three systems in one:

— an administrative system for the supply of hardware in the name of education and which now is the educative system;
— an historically and sociologically variable interpretation of knowledge purveyancing;
— a custodial institution for child penning.

If there is education in Education C it could be because: the individual resolutely and resiliently extrudes his own incidental education from within the economically sanctioned liturgy.

Resolve : (1) Maoris of New Zealand, Aborigines of Australia, Philippinos and Fijians have a lien on this folk movement in education.

(2) The key to the folk movement is self-involvement with responsibility.

(3) The evidence for a folk movement is impressive.

(4) The direction of a folk movement is pro- human growth; and growth of the self-concept.

(5) A formula for a folk movement is evolving.

(6) The role of the administrator is as a second line resource.

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CURRICULUM DEVELOPMENT IN PRIMARY EDUCATION—THE PAPUA NEW GUINEA SITUATION

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Papua New Guinea as a whole has emerged from a primitive stage to what is called a communication stage. It is as if a person jumping from the the earth to the moon within a day without realizing what was on the way. Primitive stage education was centred around:

(a) Tool-making
(b) Gardening
(c) Fishing
(d) Hunting
(e) Food Gathering
(f) Observation of tribal laws and taboos
(g) Religion based on Man and Nature.

The Feature of the primitive education was that it was informal. This meant that children learnt by observing, listening and doing. As situations arose Education was relevant for their daily living. It was all about Learning to live in the children's own environment. Primitive education did not overlook the physical development of children. Children performed certain functions according to their physical maturity, character and their place in the community. Their belief was what the community believed. Their role was what the community expected them to do. The rightness or the wrongness of their behaviour was judged by their parents, the sorcerers, the chiefs and the village elders, who were strongly backed by the gods and the ancestral spirits.

The communication stage is a time, a thing, a culture, that has been introduced in Papua New Guinea. It is the present and the future. With short contact with the Western world we have learned that special features of the communication stage are radios, televisions, telephones, satellites, telegrams and so on. It is all about speed, time, place and the result, in communication in the modern world. Modern technology then, has become the controlling factor in educational planning and school programming in developed countries.

What of yesterday, today and tomorrow of Papua New Guinea Primary Education? Yesterday was the primitive stage, today is a mixture of yesterday and the communication stage and tomorrow is unknown. However, tomorrow will depend largely on today's decision makers on political, economic and social development.

The communication stage marked the arrival of the white man. There were three major groups of white men. First, the missionaries, whose purpose for education was to spread Christian ideals and to prepare some of the local people to become preachers of Christianity. Second, the group whose interest lay in business, such as the production of copra, rubber, and many other raw materials. Their aim was to use as many men as they could get in plantations. The third group was the administration one. These people were interested in educating people who would eventually take up administrative jobs.

Today, in many ways, the three groups are coming together in formulating the content of school curriculum. It is of relevance to, briefly, outline the different stages of curriculum development in Papua New Guinea, particularly, during the directorship of Dr. K. R. McKinnon, the former Director of Education. Until the early 1960's the relevance of education in Papua New Guinea was never or hardly questioned. The realization of this has brought about five developmental stages:

1. Imitative stage
2. Derivative stage
3. Venturesome local stage
4. Modern local stage—developed by subjects
5. Integrated modern local stage.

The first stage was a simple imitation of Australian curriculum. (An experience common to all developing countries.) The second stage was an attempt to adapt the Australian curriculum to local conditions.

The third stage was the development of a local curriculum. This important stage commenced in 1960 when a committee was formed with the purpose of producing a detailed and unified syllabus designed specifically for Papua New Guinea children. The first results of the committee's work was the 1963 syllabus and venturesome and innovative, "for a radical new approach to the teaching of English, based on situational presentation of new language concepts and practice through groups was fundamental."

The fourth stage, the stage at which we are now, is the development of curriculum material in the various subject areas. The fifth stage, the one which Dr. McKinnon believed lies in the distant future, is the integration stage. However, it should not be assumed that the various subject syllabuses are not now integrated.

They (subject areas) are in as much as they complement each other in persuing the goals of primary education. However, the primary syllabus is made up of a number of sub-syllabi than being a single document. Some overlap and some gaps are inevitable as a result of subjects being developed separately.

A major concern for curriculum developers has been that because of environmental factors,* Papua New Guinea children have lagged as much as three years in comparison with the normative date Piaget has discovered for European children. This concern led to an interest in the experimental work of Dr. Dienes. Dr. Dienes stressed a discovery approach to learning through the manipulation of apparatus and material, and which sought to develop basic intellectual skills. The exciting promise of the mathematics programme is the likelihood of general intellectual development relevant to all areas of learning.

The mathematics programme has then been considered a core subject to subsequent developments in other areas. The original Dienes influenced programme was written in 1968. It covered the first three years of school. Subsequent evaluation led to a decision to rewrite the programme before proceeding with the final three years of the programme. The rewrite is known as *Mathematics for Primary Schools*. The second year of this programme is now in some schools.

THE RELEVANCE OF EDUCATION IN P.N.G.

The development of each subject area was reinforced and accelerated since the 1971 General Primary Curriculum Seminar. This Seminar was attended mainly by local officers representing all sections of the community. The main discussions were centred around school-leaver problems. Consequently there arose two major concerns:

1. A concern for those pupils advancing to higher education and who are likely to live in the momentary section of the society.
2. A concern for those children leaving at the end of Primary to return to their villages.

(and currently there is a concern for the future unemployment of school leavers—secondary or primary).

Generally the feeling of the seminar was that Primary Education in this country is inadequate for our situation, with special reference to the education for girls. Following the Resolutions of the seminar attempts have been made to make education more and more relevant to this country. The creation of *Community* Living subject area has enabled us to make schools part of village life. The general principle is that wherever schools are they must have close ties with their environment when programming.

With this principle, and as an example of some problems we face in curriculum development it is worth mentioning the position of one subject area—English. Currently the position of English in primary schools is being discussed. Discussions are centred around mainly on communication problems, especially in lower primary. It is hoped that vernacular teaching, or vernacular as a medium of instruction, may be introduced in lower primary. However, this is an area where political decision is also involved.

DIFFICULTIES EXPERIENCED

Since the introduction of the formal Western system of education several things have been learnt. One of which is the cost of education. It is to be noted that the cost of education in this country is growing faster than the national income and faster than the number of children being educated. The cost will continue to rise because of our emphasis on mass literacy and because of the rapid increase in population which will need to be literate. To change and develop curriculum in this situation is impossible to do everything at once. Money, time and special personnel are needed to make and implement a change.

MONEY

Money has become one of the biggest deciding factors in the production of school material. In order to minimise the costs the policy is to produce material locally within our financial limitations. The advantage in so doing is that the curriculum content become more and more relevant as well as less expensive.

PERSONNEL

In the past overseas personnel were used to develop curriculum. With the localization programme we face the problem of identifying suitable local officers for each subject area-development. As curriculum development absorbs middle level officers we face difficulties in maintaining them. As soon as officers show abilities for higher level job positions they are promoted to higher level jobs.

CURRICULUM—WHAT IT IS

This is a big topic and each one has his own idea of what it is. Consequently it will be influenced by people's own ideas. However, we have come to a compromised idea which may be expressed as "the summary of the selected learning experiences for children in a formal or informal situation, and which would be useful to them in their lives."

We see Curriculum Development as changing, adapting and innovating the curriculum content in order to make education relevant for a certain situation.

In our situation Curriculum Development has become a trial-and-error exercise. In many cases we lack the necessary information, general or specific, to guide us in our curriculum development.

Papua New Guinea has so many cultural groups of people, so many cultural values and systems, so many ways of looking at the world, so that the only solution would be to have several curriculum centres for each group.

The information needed to present material at the right level is lacking in our situation even though we have the guidance of men like Piaget or Bruner. In this respect we need to have more time for trialling our programmes or for the whole curriculum development.

CURRICULUM IMPLEMENTATION

Some of the greatest difficulties lie in the implementation of whatever programme we put out are:

(a) Teachers are confused with so many changes.

(b) Teachers' ability to implement a new idea or programme is very limited.

(c) The cost of the implementation of a new programme limits us.

(d) Communication throughout the country is a failure in most cases.

(e) The acceptance of new ideas by teachers, curriculum advisers, inspectors, teachers' colleges and the public, takes a long time, for the success of a new problem depends largely on the understanding and the attitudes of the implementors, not disregarding the attitudes of the recipients of primary education.

TOWARDS A PHILOSOPHY OF PRIMARY EDUCATION

Very often Papua New Guinea (or the Department of Education) is criticized for not having a philosophy of education at all. Teachers' Colleges in Papua New Guinea often comment that the 1967 syllabus is hopeless as it has no philosophical basis. In fairness to the authors of the syllabus it should be commented that careful reading will lead one to say that it is based on the philosophy of change. However, this is not enough for our purpose.

Really curriculum development has been in a hotch-potch fashion. That is, due to the rapid change and consequent problem we began to develop each subject without really knowing the direction. On the whole curriculum development has given us the golden opportunity to ask certain fundamental questions.

1. *What are the Basic Disciplines of Curriculum Development?*

The answer is best illustrated by the triangle which, on one side we have educational psychology and another with the educational sociology, and the third side with the educational philosophy.

Educational Sociology

Educational Psychology

Educational Philosophy
Curriculum

Most people would agree that educational psychology takes into account the developmental and the principles of learning applicable in the learning process. In this respect we constantly ask the question "how do Papua New Guinea children learn in their environment?" This enables us to provide a curriculum which will be based on the Papua New Guinea children's learning behaviour.

Educational sociology considers the school as a social institution and its relationships with other social institutions, for example, the family, the tribes, the villages, etc., in providing the learning situation. The best illustration would be the revised social studies syllabuses which gives children the opportunity to study self, then family, clan, tribe, and other countries and people by the end of Standard 6.

But Educational Philosophy is responsible for giving the direction of the learning process. Among its functions is the search for values, the preferences to be followed by the users and implementors of psychological and sociological principles. It is believed that psychological and sociological principles are the same the world over. The difference lies in the value commitment of educators, that is, parents, teachers and others who are more mature and who guide the less mature. In setting out our educational aims and objectives the Papua New Guinea Values and views are definitely taken into account. In fact steps have been taken to get local people to make curriculum decisions.

2. *Education for What?*

The most obvious answer for a developing country is education for change. One would tend to ask "what change?" There has been much discussion among our subject developers, teachers, curriculum advisers, inspectors, and local people as to what education would be most suited to this country. The subject developers' responsibility lies in the fact that they have to know, understand, and be able to put into curriculum what it is that children should learn.

Briefly, subject developers have been following principles as outlined:

(a) Curriculum planners and developers should aim to:
Provide a curriculum which will enable educators (implementors-teachers, curriculum advisers, inspectors and parents) to become more sensitive to the needs of the Papua New Guinean child, with his special aptitudes and capabilities, faced with all the seen and unforeseen problems of the country as it develops.

(b) All curriculum planners, developers and implementors should have in mind:

(i) The individual and his personal development.
(ii) The necessary skills he will need to live and function effectively as a member of his community.
(iii) The skills, knowledge and abilities he will need to develop as he becomes involved in his community.

Personal development should aim to develop:

— citizenship
— ethical standards and values
— health practices and
— vocational interests.

The necessary skills involve:

— the skills of communication and recording
— critical, rational and scientific thought and
— work habits and attitudes.

Involvement in environment should aim at developing:

— consumer skills
— relationship with environment and
—appreciation of the Arts (local and introduced).

3. The above question has led us to closely look at education in Papua New Guinea. Perhaps the same question could be framed in another way—*What is the National Purpose of Education?*

It seems the question is best answered by looking at the country as a whole.

(a) Is Papua New Guinea a democratic country or other?
(b) Does Papua New Guinea have respect for human dignity?
(c) Does Papua New Guinea recognize and accept modernization? If so how much acceptance there is/will be?

Of course, the answers are obvious! However, it is to be realized by all educators that in a democratic country the nation is designed to serve the individual, not the reverse. In other words democracy tries to harmonize the freedom and well being of the individual with the strength and well-being of the society. Consequently school curriculum should be individual-school-society-centred rather than subject-centred.

In the main Papua New Guinea recognizes and accepts the dignity of man. School curriculum should cater for the development of the whole child as a human being. That is, school curriculum should be concerned with developing a child mentally, socially, spiritually and physically, taking into account local cultures, beliefs, and practices.

If Papua New Guinea is committed to modernization (which it is) it is to be realized that emphasis is to be placed upon science education in order to understand and control the natural environment, upon health education to preserve and enhance the quality of human life, and upon social science education to help the children see themselves in relation to their environment. On important purposes for education as a whole should be to equip the children so that they can participate in, and contribute to, the modernization process, that is, the process of creating a style of life that will have the imprints of traditional strengths even as it adapts new ideas and technologies to its existing ways of living.

As a general aim all educational programmes should provide the element of understanding and awareness, character and judgement necessary to deal with new and changing situations. That is, an education for today and tomorrow should be one which prepares children for social *changes seen and as yet to be seen,* and it should prepare them not only in terms of skills, but also in terms of character, perspective and personality capable of adapting to new situations. Putting it in another way, Primary Education should deal adequately with the physical, mental, spiritual and social dimensions of well-being connected with the events of life and the progression of life in a specific environment.

THE TURNING POINT IN PAPUA NEW GUINEA

The first question is what is the turning point in Papua New Guinea?

Why? The Papua New Guinea tendency in creating elitism and its experiences in the school leaver problems, together with modern trends in education, necessitated the turn or change. For example, today education is individual—society-centred rather than subject-centred.

Consequently the turning point arises from the past view of curriculum as *the total effort of the school* to bring about desired outcomes in school and out-of-school situations. The Papua New Guinea view of primary education is that the success will depend on the efforts of *schools together with community efforts.* That is, community variables, including people, become teachers (or the community as whole becomes the teacher) and school teachers become guides and advisers. The school should be part of the village or the community.

Thus, since the introduction of the 1967 syllabus, and especially the new approach to teaching maths, primary education has been adopting the conceptual approach. That is, primary education is not only concerned with skills, but also with bringing about psychological changes in learners as a result of their activities in an educational institution or in their community cultural activities.

A WAY OUT: THE LOCAL ENVIRONMENT

1. *Traditional Culture::*

There is a need for the child the familiarize himself with his own culture through practical means. That is the child should continue to be an active participant in his environmental, cultural activities, including gardening, fishing and hunting. For rural dwellers traditional cultures are strong supported and the people live by these. A child who may not have the opportunity to get out of his own cultural environment has to live by his culture. In his case he has to learn to take their place in the non-changing cultural element as well. School curriculum should be organized so that the child will be familiar and find his identity through his culture.

2. *Western Culture:*

This is a foreign culture which is already valued highly by Papua New Guineans. Its special feature is the technology and the language it uses to communicate and advance. There is a need for the child to look into this culture. He needs to see the advantages and the disadvantages of this culture.

3. *Cultural Integration:*

The environment is always changing physically and socially. People are involved in this change, especially, in social change. The child's physical build changes, his attitudes and personality change. Everyday the child sees, hears and experiences something new. Depending on the location of the school and who the teachers are and people with whom he makes contacts, his personality may tend to be more towards one or the other culture. As cultures blend to become one the child should be able to see where he fits in.

4. *Flexible Personality:*

Due to the *changing* Papua New Guinea environment, schools should educate a child so that he is better able to *adapt* himself to change. That is, a child leaving after Standard six should feel secure to live either in a rural or urban environment.

The child's personality should be such that he would be able to adapt himself to, and interpret national aims so that they will suit him as a person and contribute towards the community. For example, currently a great emphasis is placed on the *economic* development in this country: "a rapid increase in the proportion of the economy under the control of Papua New Guinean individuals" or "a more self-reliant economy, less dependent for its needs on imported goods . . ." (1973/78 Government Improvement Plan). This may be changed to suit future rising needs.

The major implication of such statements is that the future Papua New Guinea Society will be economically productive leading towards self-reliance or self-sufficience.

For the school-leaver, his responsibility would be to innovate his traditional means of self-reliance in order to meet arising needs.

5. *Language—A Medium of Instruction:*

Language is generally defined as a medium of communication. As a *medium of instruction* the aim is to communicate an idea or a message to a pupil. This assumes that the pupil can already speak and understand the language of instruction. In this case the pupil at the lower primary only needs to be taught reading and writing. Towards the upper level the pupil may also be taught literary and grammatical aspects of the language.

In Papua New Guinea situation this is not so. That is, most of the children entering school do not speak English. It seems logical, and educationally, psychologically, and socially, sound to begin school with a vernacular as a medium of instruction. However, we realize that we will face many difficulties as you are aware that we have 700 different languages in this country.

Whatever the language policy may be, in all cases, the aim will be to achieve fluency in some or all of the following: understanding, thinking, speaking, reading and writing.

6. *General Aims of Primary Education:*

In view of what has been said, it is felt that if education follows the following directions, we will do greater service to the future men and women of this country.

(a) Make Primary Education sufficient in itself. That is Primary Education should be such that it is adequate for pupils following any stream of life at the end of Primary, whether the stream be higher education, a vocational centre, or back to the village situation.

(b) Provide a curriculum which will meet the needs of the pupils in their own environments, and to produce the kind of men and women who will actively be inquiring, flexible, innovation and who can face uncertainty and ambiguity and can creatively formulate new ideas to meet changes in whatever environment they may be.

(c) Provide a curriculum which will enable the children to be familiar with their traditions and to find their identity through their cultures.

(d) Primary Education should not simply aim to enable an illiterate child to decipher words in a textbook, but also enable him to be better integrated into his environment, to have a better grasp of life in his community; to enhance his personal dignity; and to have access to sources of knowledge which he may find useful to lead a satisfying life.

DEVILS OR ANGELS? PUPIL MISDEMEANOURS IN PAPUA NEW GUINEA PRIMARY SCHOOLS

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Amongst the earliest detailed information about pupils' offences in schools is a set of regulations drawn up by John Vaus for the Aberdeen Grammar School, Scotland, about 1553. Corporal punishment was administered for these offences:

Using the vernacular
Lateness
Inattention
Lack of preparation
Moving about
Speaking
Fidgeting (Hoskins, 1954, p. 8).

Four hundred years later, an American Study of pupil misdemeanours produced a similar list. Pupils in an American High School reported the misbehaviours they were punished for; the most frequently reported misbehaviours, in descending order, were:

Talking
Inferior School Work
Disturbing class
Inattention
Laughing
Tardiness
Cutting Class (Garrison, 1959, p. 153).

Common to these lists are talking, inattention, disturbing the class (moving about) while "Lack of preparation" sounds similar to "Inferior school work". It would seem that pupils' misbehaviours or at least teachers' perceptions of what are misbehaviours, have not changed much.

Studies done at other times, in other countries, whether among primary or secondary schools, and whether among teachers or pupils, have produced rather similar lists of the types of misbehaviours pupils most frequently commit. (Highfield and Pinsent, 1952; Coyne, 1973; Wickman, 1928.)

Most investigators of the problem of pupils' misbehaviours in school have concluded that these problems are anti-social behaviour. Teachers, whether reporting on the frequency of misbehaviours, or their seriousness, tend to rate high on the list problems of lying, truancy, disobedience, disturbing class organisation, cheating, destroying school property (Wickman, 1928, p. 113).

Later studies have also shown teachers to be most concerned with anti-social attitudes. Whetstone (1967) comparing teachers and school counsellors, reported that teachers were more concerned with pupils conforming to socially approved behaviour. Mutimer and Rosemier (1967) used the Wickman list of behavioural problems to compare teachers' and pupils' views of pupils' behaviour; teachers were found to be mainly concerned with anti-social behaviour. Tolor, Scarpetti and Lane (1967), comparing psychologists and teachers, came to a similar conclusion. Coyne (1973) also found Papua New Guinea High School teachers showed least approval of a pupil whose behaviour was anti-social. Stouffer and Owens (1955) investigated whether any new problems of pupils' misbehaviour had arisen in the 25 years since Wickman's investigation. They found only three: reading comic books, chewing bubble gum and watching television.

Stern (1963) in his review of teacher-pupil relationships, found the problem of power and control to be a persistent aspect of this relationship. Teachers appear to see their primary role as providing training in the knowledge and method of academic subjects, with their main concern being to secure behaviour from each individual which ensures his working harmoniously with everyone. When British primary and secondary school teachers were asked to rank six educational objectives, they ranked Instructional Training equal first with Moral Training, ahead of Social Training, Education for Citizenship, Education for Family Life, and Social Advancement (Musgrove and Taylor, 1965).

Matlin and Mendelsohn (1965) surmised from their work that teachers may tend to give better grades to the pupils who display socially approved behaviour. Feldhusen, Thurstone and Benning (1967; 1970) came to a similar conclusion. Morrison, McIntyre and Sutherland (1965) found Scottish primary school teachers used three highly consistent dimensions in their ratings of pupils, the first being *Good Behaviour*. Hallworth (1964) reported a similar finding, and a high correlation between these three factors and academic achievement and intelligence.

Common components of the concept of socially approved behaviour include being obedient and working quietly. Cohen (1971) found student teachers who are highly dogmatic preferred pupils who are obedient and willing to accept the judgements of authorities, as well as being quiet and preferring to work alone. Ferron (1965) compared teachers according to their level of education in Sierra Leone; he found that the group with less education were more in favour of pupils working quietly and being obedient.

An important aspect of the results of teachers' views of their pupils is only just beginning to be studied: that teachers' views of their pupils' abilities significantly influence pupils' academic results. In other words, if a teacher perceives a pupil is a good pupil, that pupil will have a better chance of doing well academically. In their review of recent investigations into teacher and examiner expectancies, Rosenthal and Jacobson (1968) tentatively concluded that sometimes a subject's performance of an intellectual task may be unintentionally determined by the expectations that the examiner has about the subject's performance. In their own large-scale experiment, involving primary school pupils, they found that favourable expectations by teachers led to a significant increase in the academic performances of their pupils. And Pidgeon (1970) reviewing the results of streaming in English schools, concluded that the relatively large differences in the levels of performance between the most and least able pupils in England are due in no small part to the expectations of their teachers.

GENERAL CONSIDERATIONS

It appears that investigations into pupils' misbehaviours have revealed:

1. The type of misbehaviour most commonly reported does not change much regardless of time or country, or whether the school is primary or secondary level.
2. The misbehaviours reported are almost all over anti-social behaviour.
3. Teachers view these misbehaviours as serious since they interfere with their classroom control and classroom decorum.
4. Those personality problems of children which do not directly interfere with classroom decorum (being unhappy, slovenly in appearance, dreamy, shy) do not concern teachers as much as do anti-social behaviours which do interfere with classroom decorum.
5. Teachers who show most concern about pupils' misbehaviours may tend to be more dogmatic and less well educated than their teacher peers.
6. Pupils who misbehave have less chance of doing well academically.

SURVEY OF PUPIL MISDEMEANOURS IN PAPUA NEW GUINEA PRIMARY SCHOOLS

During 1971-72, reports from school headmasters, the Papua New Guinea Teachers' Association, District Superintendents and Inspectors, District Education Boards, and informal lines of communication, had produced enough information on pupils' misdemeanours and schools' punishments to make the members of the National Education Board of Papua New Guinea feel concern. The members could readily see that there were discrepancies in disciplinary practices between schools in the same districts, and between districts; that a misdemeanour could receive different reactions according to which school or district it occurred in. Furthermore, there was inconsistency in responses; a serious misdemeanour might merit a milder form of response than the response evoked by a slight misdemeanour.

The first problem that needed to be investigated was: what misdemeanours were the pupils committing? Only then could the pattern of punishments be looked into, and judgements made about the relative consistency of such.

However, if teachers were to be asked what misdemeanours their pupils commit in school, it seemed that—assuming a teacher did answer the question—his response could be biased in that he might omit what he considered to be major misdemeanours, since this might indicate he could not handle his pupils properly; or he might not wish to "tell tales" on his pupils.

The best way to overcome this possible bias, it was thought, was to find out from teachers what misdemeanours they *knew about*. This is not asking teachers to report on themselves, or even necessarily to report on their own pupils. The teachers were to be asked:

> Will you please list all the kinds of bad behaviour in children that you have met or heard about, in schools. Do not give the causes of bad behaviour, but only say what behaviour is undesirable or bad.

In addition, a sample of the population which could be expected to have information about children's behaviour in primary schools was asked the same question.

This population consisted of Standard 6 pupils, members of the Boards of Management of primary schools, District Superintendents and Inspectors, Members of Local Government Councils and District Education Secretaries. (For this investigation, Boards of Management were considered to fairly represent parental opinion since most members are usually elected by parents from among parental nominees. The parents approached in this way had the advantage of being more readily contacted, and it was assumed that they would be more literate than the average parent.)

Whilst from a theoretical point of view it may be impossible to generate the complete universe of items in the domain of pupil misdemeanours (Nunnally, 1967, p. 175), the population approached for information in this domain could be reasonably expected to report a great number of misdemeanours. To further ensure this, attempts were made to produce the maximum response rate from the population surveyed.

COLLECTING THE INFORMATION

The six groups chosen as representing Papua New Guineans directly concerned with education are large in number and the members are widely scattered. It was decided that the only practical way to conduct this first stage of the survey was to send out a questionnaire by mail. The procedure was to send to each informant, in the one envelope, a letter explaining the purpose of the survey, a sheet asking for information in the words already quoted, and a stamped envelope with the address of the investigator on it.

TABLE 1. *Sources of information and response rates*

Informants	*No. in 1972*	*Total forms sent out*	*Percent of pop.*	*No. of returns*	*Percent response*
District Superintendents	18 Districts	18	100	10	55.6
Boards of Management	1,592	118	7.4	60	50.9
Primary School Teachers	6,383	118	7.4	52	44.1
Standard 6 Pupils	25,884	118	7.4	48	40.7
Local Government Councils	155	34	21.9	11	32.4
District Education Secretaries	57	51	89.5	28	54.9
Unknown	—	—	—	5	—
TOTAL		458		214	46.9

No one was asked to provide any information which could trace the papers, but each paper had a number on it which was a record of to whom the paper had been sent, for statistical checks on sources and rates of response. Five papers were returned with the number removed. These were tabulated as *Unknown Informant* in Table 1.

Two follow-up letters were sent out, the first two months later, and the second a further month later. The population chosen and the response rates are shown in Table 1.

TABULATING THE INFORMATION

Once the responses were in they were recorded on a master list. No attempt was made at categorisation at this stage, the aim was basically to eliminate repetion of information. Once all the information had been recorded, it was found that a total of 146 misdemeanours had been reported.

However, closer examination of this list enabled reductions to be made. Firstly, some items had been recorded twice. Then certain categories were imposed, and the examples given of misdeeds then included. The best example of this was the category of damaging. It was felt that the object being damaged was not particularly important, but whether damage did occur, and whether it was to school property or teachers' property. So more than 21 items, some rather repetitive, were grouped together, into two categories:

Damaging teachers' property.
Damaging school property.

Altogether, 96 items were then on the final list.

FREQUENCY RATING OF MISDEMEANOURS

A group of experienced Papua New Guinea educators was then asked to rate the items as to frequency of occurrence in primary schools. The group is shown in Table 2.

TABLE 2. *Groups who ranked misdemeanours according to frequency*

Respondents	*Number*
District Inspectors and Superintendents	24
Primary School Headmasters doing an advanced course of study at the University of Papua New Guinea	8
Primary Teachers doing a Headmasters' course at two Teachers' Colleges	55
TOTAL	87

These people, coming from all parts of Papua New Guinea, are mature, experienced qualified teachers. It may be fairly claimed that their combined opinion presents a view that is representative of the education situation at the national level.

Respondents were asked to tick each item according to whether it was very common, common, unusual, very unusual. The items were then tabulated according to the number of ticks, and a frequency distribution established for each item and each category. Responses were then totalled for the *very common* categories, and the percentage response calculated using the maximum response rate of 87 as the basis, whether or not all 87 respondents had ticked the particular item.

The misdemeanours which reportedly are the most frequent in Papua New Guinea Primary Schools are shown in descending order of reported frequency in Table 3.

TABLE 3. *Frequency of misdemeanours in Papua New Guinea Primary Schools*

Rank	
1	Talking
2	Laughing
3	Coming late for school
4	Telling lies
4	Working too slowly
6	Speaking place talk (the vernacular)
6	Swearing
6	Leaving rubbish in the classroom/school yard
9	Disturbing other pupils
9	Being careless in work
9	Laziness

IMPLICATIONS OF THESE RESULTS

1. The question of the acceptability of local languages by teachers needs further investigation. It is common for newly independent countries to seek to develop a national language, and to use this as the medium of instruction in schools. Already the PNG Department of Education is exploring the possibility of allowing teachers the option to use local languages in the early stages of Primary Schooling. However, the history of the tenacious hold of Latin and Greek as the medium of instruction in European schools for several hundred years, and recent difficulties encountered in Asia and Africa where countries have attempted to introduce a national language as the medium of instruction in their schools, show how difficult it is to change one medium of instruction for another. One possible interpretation of this study is that while the Department of Education may think it has psychological and pedagogical grounds for allowing the use of the vernacular in its primary schools, teachers on the whole do not seem to share this view. Any attempt to introduce local languages must therefore be prefaced by strenuous attempts to change the thinking of teachers on the role and status of local languages in the classroom.

2. Teachers need to concern themselves with character training, and be conscious of what sort of pupil they wish to produce. It would seem that misdemeanours in Papua New Guinea classrooms are similar to those of Scottish classrooms over 400 years ago. In both situations teachers showed concern with pupils speaking the vernacular, coming late to class, disturbing the class, and talking. However, the disquieting feature of this is that we like to think that our schools are happy places where children come to learn things relevant to their geographical situation, way

of life, and aspirations. We also like to think that our teachers are trained to help the child develop his personality and talents to the full. And we like to think that the classroom is a place where the child will learn through discovery and experience. However, judging by the list of most frequent misdemeanours, there is little evidence to show that these assumptions are true in our primary schools at the moment.

The picture of a typical Papua New Guinea classroom that emerges from the list of most common misdemeanours suggests that teachers are most concerned with classroom decorum. The most common misdemeanours are clearly those which interrupt the work of the teachers' instruction, or the pupils' individual or collective work. But the question must also be asked: what sort of pupil would emerge finally from a classroom in which talking and laughing were removed; where the human foibles of late arrival, of working slowly, disturbing others, being lazy, were non-existent, or where the crimes of telling lies, speaking the vernacular, or leaving rubbish around, were banished. Might not the final product of such a classroom be himself a misfit, an aberration?

3. An expatriate inspector of P.N.G. High Schools remarked some years ago that expatriate teachers did not complain about the behaviour of their pupils, and concluded that on the whole the Papua New Guinean pupil is less exuberant, less noisy, and less likely to answer back than his Australian counterpart (Were, 1967, pp. 43-44). The present list of most common misdemeanours in P.N.G. primary schools suggests that the average classroom presents no really serious discipline problems. One must agree with Were that the typical Papua New Guinea primary school child is a well-behaved pupil.

APPENDIX

Reports of most frequent misbehaviours in pupils, arranged in descending order of occurrence.

1. *Vaus* (1553), Scotland (Secondary)

    Using the vernacular
    Lateness
    Inattention
    Lack of preparation
    Moving about
    Speaking
    Fidgeting

4. *Garrison* (1959), U.S.A. (Secondary), Pupil's Report

    Talking
    Inferior school work
    Disturbing class
    Inattention
    Laughing
    Tardiness
    Cutting class

5. *Coyne* (1973), Papua New Guinea (Secondary) Teachers' Report

Disturbs class organisation
Regresses occasionally (playful, childish)
Stubborn
Bashful
Negativistic
Timid
Domineering
Haughty and self-satisfied
Non-conforming
A good-guesser

2. *Wickman* (1928), U.S.A. (p. 30) (Primary) Teachers' Report

Whispering
Inattentive
Careless in work
Tattling
Disorderly in class
Interrupting
Failure to study
Shy, withdrawing
Day dreaming
Lack of interest

N.B. This list is the *most frequent* pupil misdemeanours in one school. The better known list is the *most serious* misdemeanours.

3. *Highfield and Pinsent* (1952), England Primary and Secondary Teachers

Restlessness, fidgeting
Indifference, laziness, apathy
Boisterous, noisy behaviour
Persistent carelessness
Forgetfulness, unpunctuality
Persistent chattering
Casual absenteeism
Deceit: Cheating, lying
Bickering, teasing, interfering with other pupils' work
Evasion—sliding out of own share of duties.

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A STUDY ON MATHEMATICS IN PAPUA NEW GUINEA

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In the last fifteen years or so, there has been a marked increase in the number of cross-cultural studies carried out in various parts of the world. Studies have been completed in several African nations, in Asia and in the Americas. Most studies have involved either minority groups or developing nations.

The stimulus for many of these studies has been the work of Piaget and Bruner. Piaget's developmental psychology and Bruner's theory of learning have inspired the replication and extension of some of their studies in widely spread areas of the world. In this way, much has been learnt of the patterns of learning and stages of cognitive development in developing countries and of children in general.

Cross-cultural studies have a significant purpose in relation to developing countries. In general, it can be said that cross-cultural studies in psychology contribute to the increasing knowledge of the process of human development. When it is possible to study the effects of different environments on the development of children, generalisations can be made as to the value of these respective environments.

The other very important contribution of cross-cultural studies is the testing of the universal validity of psychological theories. Can the results obtained in metropolitan Australia be generalised as a theory applicable to all mankind? Cross-cultural studies which confirm or negate psychological theories evolved in western societies add greatly to the validation or otherwise of these theories.

As educability is measured by a wide range of tests, it should be possible by means of quantitative techniques to discover not only the basic constituents of intelligence, but also its cultural and genetic determinants. For this reason, also, cross-cultural studies are needed.

Accounts of studies carried out in the American, African and Asian regions indicate that cultural differences affect an individual's performance on psychological and educational tests. These differences involve more than content and the habits established by education. They involve manipulative habits, symbolic reactions, possibly the entire approach to the perceptual world, where skills, both individual and tribal, have been developed over generations.

SOME ASPECTS OF MATHEMATICS EDUCATION

To any who have studied the work of Piaget in particular, and Bruner also, it will be fairly obvious that concepts which are important in mathematics are given special prominence. Conservation, for instance, is a vital concept of numeracy but much more so for more advanced mathematics. Geometrical and spatial concepts are fundamental to living and the class inclusion concept leads to more complicated aspects of mathematics as well as giving greater insight into everyday situations.

Might I suggest that this special prominence is given because of the nature of mathematics as a subject, and hence of what might be termed mathematical thinking. Mathematics is not a collection of unrelated facts (although, unfortunately, many have learnt what goes by the name of mathematics in this way) but a structure built up logically from subordinate concepts to superordinate concepts. Mathematics is the study of the relationships between concepts of different or the same order. For example, taking a more general view, 'red' is a concept children can grasp by having experience of a large number of red objects, and the superordinate concept of 'colour' can be gained by experience on the child's part of a large number of colours, including red. The understanding of the concept 'colour' depends on how well the child has understood the concept of 'redness', of 'blueness', etc. Because of the nature of mathematics where one concept depends so much on previously acquired concepts, the thinking required to master mathematics is very much akin to deductive or logical thinking.

What, then, is the special place of mathematics in developing countries? If a developing nation is to take its place alongside other nations of the world, it must develop its technology to the extent where it can compete with more highly developed nations. Increased technology means a certain standard of mathematics—not for everyone but for those few who will work specifically with the technological advances required. Because, however, mathematical thought is so allied with logical thinking, it is desirable for everyone to become as proficient in mathematics as is necessary in order to have an understanding of the determinants of change, particularly in periods of rapid change.

The formation of concepts forms a large part of a mathematics course in the primary school. The achievement of understanding, however, is an essential element of an effective educational system. It is also essential that the child's introduction to mathematics be in terms of concrete experiences. Otherwise, the subject lacks meaning and purpose.

Understanding in mathematics can be the awareness of simple properties and relationships. At the other extreme, it can be the recognition and comprehension of complex patterns and structures. We can speak of different levels of understanding. For instance, when a child is learning the concept of a 'square', he may recognise the shape if one pair of sides is horizontal, but not when it has been rotated through an angle of 45°. That is one level of understanding. A deeper level of understanding is achieved when a child recognises the square in any position.

BACKGROUND TO PRIMARY MATHEMATICS IN PAPUA NEW GUINEA

Many of you will know better than the writer, the course which mathematics education has taken in Papua New Guinea. Notwithstanding, the main stages in the development of the present mathematics programme in the primary schools will be briefly reviewed.

Concern for the teaching of mathematics had been felt for some time and difficulties, such as relevance, language and the heritage of rote learning were obvious. The Education Department undertook the development of a modern mathematics programme.

1964: Four project schools began work under the guidance of Professor Z. Dienes, then Reader in Education at the University of Adelaide.
1965: Instructional material was produced by the project schools.
1966: The project continued. A conference of teachers and training college staff was held.
1967: A draft syllabus for Primary Schools was prepared. District courses were conducted. The Temlab programme was written. Temlab consists of a series of cards and aids, covering a three-year course in number sets, measurement, geometry and logic.
1968: Temlab was introduced in primary schools. Mathematics advisers were appointed to fifteen districts.
1969: Revision of Temlab began. Trial programmes were sent to Professor Dienes for evaluation.
1970: Writing and evaluation in schools of Revised Temlab. Year 1 programme began.
1971: Revised Year 1 cards were completed. Writing of Year 2 was completed.
1972: Year 2 programme trialled and evaluated. Year 3 programme was begun.
1973: Year 1 programme ready for distribution. Year 2 programme ready for printing. Years 3 and 4 to be completed. Limits for numeration and manipulation set.
1974: Year 2 programme introduced in some schools.

DESCRIPTION OF INVESTIGATION

(a) *THE TESTS*

A battery of twelve tests was administered to the subjects. This included the following tests:

1. MATHEMATICS UNDERSTANDING TEST

   This test was used more extensively than the other tests for analysis purposes and consisted of sixty multiple choice items with four distractors. These sixty items covered the range of the syllabus in mathematics, with questions on number, measurement, logic, geometry and sets. Nineteen items which were more directly related to Temlab were included.

2. RAVEN'S PROGRESSIVE MATRICES

   A test of general intelligence. It consists of five sets with twelve items in each set.

3. HICK'S SCHOLASTIC APTITUDE TEST

   A test of general intelligence. It consists of two parts, verbal and numerical.

4. VERBAL TEST

   This contained fourteen items on vocabulary, six similarities and fifteen sentences for completion.

5. GOTTSCHALDT'S EMBEDDED FIGURES

This is a test of visual perception.

6. FORMBOARDS

This test of visual perception contained twelve items.

7. ABSTRACTIONS

This test consisted of twenty items in each of which the subject is asked to abstract the relevant pattern and complete the statement.

8. ANALOGIES

This was a test of geometrical analogies designed to test a subject's ability to reason and perceive patterns.

9. SERIES

A test of number ability.

10. GENERAL INFORMATION

This was a thirty item multiple choice test, covering everyday objects and events, national and international events.

11. PIAGET I

This was a test using oral questions and demonstration to which the subjects responded with written answers.

12. PIAGET II

This test involved the individual manipulation of simple apparatus.

(b) THE SAMPLE

A total of 551 subjects were tested. These consisted of 224 local teachers, 60 European teachers, 139 local students in their final year of training, 113 local and 15 non-local Standard VI pupils. The sample was drawn from five different regions of Papua New Guinea, as follows:

District	*Standard VI*	*Trainees*	*Teachers*	*Total*
Central	24	23	79	126
Madang	30	6	41	77
Morobe	24	34	76	134
Eastern Highlands	24	40	23	87
Western Highlands	26	36	65	127
Totals	128	139	284	551

(c) *ADMINISTRATION OF THE TESTS*

The testing programme occupied nine weeks towards the end of 1971.

(d) *STATISTICAL TECHNIQUES USED*

The following statistical procedures were used on data collected from 551 subjects.

(i) the analysis of test scores in relation to differences in performance of the four groups tested;

(ii) the factor analysis of all tests;

(iii) the analysis of certain variables in relation to the teachers' performance on the Mathematics Understanding Test;

(iv) the detailed item analysis of the Mathematics Understanding Test.

RESULTS OF STUDY

(a) *COMPARISONS BETWEEN GROUPS OF SUBJECTS*

In order to compare the relative performance of the four main groups in the investigation, i.e. European teachers, local teachers, teacher trainees and local Standard VI pupils, the mean score for each of the twelve tests was computed.

The European teachers did significantly better and consistently better than all other groups in all tests. The trainees did significantly better than the local teachers on ten tests and significantly better than the Standard VI pupils on all tests. The local teachers did significantly better than the Standard VI children on all tests.

These results are very much as might have been predicted and are a reflection of the length and quality of education and training which the different groups have experienced. The European teachers, on the whole, have a better educational background than any of the local groups. The teacher trainees, because of the gradual raising of entry qualifications required and the lengthening of the training course, would be expected to have a more sophisticated approach to the test battery than the group of local teachers, many of whom have a much more limited educational background and training. Since the local teachers did significantly better on all tests than the Standard VI children, it would appear that there is no significant change in the quality of the Standard VI children, and that the significant difference in the performance of the two groups would be due to the training and additional schooling the teachers have had.

(b) *FACTOR ANALYSIS*

As the analysis was fairly complicated due to the nature of the tests used and the methods of approach adopted and has little immediate bearing on the other parts of the investigation, I shall briefly summarise the main results.

A verbal factor, a general reasoning factor and a numerical reasoning factor were isolated. It is therefore reasonable to state that factors, such as verbal ability, reasoning ability and number ability contribute to mathematical achievement as it is measured by the Mathematics Understanding Test.

(c) *THE EFFECT OF CERTAIN VARIABLES ON MATHEMATICAL UNDERSTANDING*

To discover what effect such variables as sex, length of teaching experience, length of training and education, and country of origin have to performance on the Mathematics Understanding Test, an analysis of variance was considered. The distributions in the sample were of such a character as to make a formal analysis of variance dubious. To overcome this problem, it was decided to use a technique specially programmed for this kind of situation. The Mitkel Multi-level Chi-Square programme was applied to the data from the Mathematics Understanding Test for the four groups, European teachers, local teachers, teacher trainees and Standard VI pupils, 537 subjects in all.

The Mitkel Multi-level Chi-Square technique used by permission of Dr. M. Kelly and Mr. G. Mitchell of Macquarie University, N.S.W., produced main effects and first, second and third order interactions, between the independent variables of sex, experience, training and origin and the dependent variable, the Mathematics Understanding Test. To determine the meaning of interactions, reference was made to the subcalculations shown on the computer printout. These subcalculations consist of the raw data and expected frequency for each category used.

Significant interaction were shown as follows:

Main effects:	experience, training, country of origin
First order interactions:	sex/origin, experience/training, experience/origin, training/origin
Second order interactions:	sex/experience/training, sex/training/origin, experience/training/origin
Third order interactions:	sex/experience/training/origin

From the analysis of the subcalculations and interactions, the following conclusions were drawn:

1. Inexperienced, untrained subjects do poorly on the Mathematics Understanding Test in relation to the rest of the sample.
2. Experience affects performance on the Mathematics Understanding Test. European teachers appear to benefit more by experience than local subjects; the latter show some improvement in the first few years of teaching, but their limited educational experience and background does seem to inhibit the fullest possible development of their understanding of mathematical concepts and skills. Perhaps the reason for this is to be found in the home, and the curriculum and teaching methods at the primary school level. If short term successes are linked closely with content of the material taught and the learning by rote at earlier stages, then the rate of application of new ideas, new methods and experience is going to be curtailed.
3. Training affects performance on the Mathematics Understanding Test also. There is a definite gain in ability with the second year of training. This applies more to local subjects than to Europeans and slightly more to male locals than to female locals. This is understandable if the European teachers start their training courses better prepared by previous education and experience and more receptive of new ideas than the local teachers. A 'ceiling effect' would seem to be involved with the local teachers making greater gains relative to their positions at the beginning of the course. That the local female teachers also make definite gains in ability in the second year of training may be similarly explained; that this gain is less than that of the male local teachers might be due to the fact that they start with less experience but nevertheless, are fully equipped to benefit from their course of training.
4. Female locals are much weaker in performance on the Mathematics Understanding Test than male locals.

5. European teachers perform better on the Mathematical Understanding Test than local subjects. While there is little difference between the performance of the two sexes for Europeans, the local males perform very much better than local females.

Further related results of lesser importance were found.

From the above results based on data obtained, the two major variables which affect mathematical achievement as measured by the Mathematics Understanding Test, are years of training, and hence of schooling, and country of origin. Experience is an important variable but has limited effect and sex is a significant variable for locals only.

(d) *ITEM ANALYSIS*

Several item analyses were carried out, using a computer programme prepared for the Department of Education in Papua New Guinea for the analysis of public examinations. Each item of the Mathematics Understanding Test was analysed for each of the following groups:

230 local teachers
60 European teachers
134 Teacher trainees
113 local Standard VI pupils
15 non-local Standard VI pupils
551 total number of subjects
Local teachers with Forms III, IV entry qualifications and experience in Temlab
Local teachers with Forms I, II entry qualifications and experience in Temlab
Local teachers with Primary school qualifications and experience in Temlab
Local teachers with Forms III, IV entry qualifications and no experience in Temlab
Local teachers with Forms I, II entry qualifications and no experience in Temlab
Local teachers with Primary school qualifications and no experience in Temlab.

The sixty items of the Mathematics Understanding Test were divided into ten groups according to their content. Through the analysis of each item it was hoped to determine any areas of mathematics in which definite deficiencies exist, to compare the performance of the groups tested and to discover if experience in teaching Temlab gives a teacher an advantage in understanding mathematical concepts.

In general, the European teachers were superior to all other groups in each section, and the local Standard VI pupils were in general the poorest. Teacher trainees are better on overall performance than local teachers.

On items on place value there seemed to be less differentiation between the trainees and the local teachers. The items on geometry, requiring recall only, were better done than most other sections. Very few items were well done by any of the groups and deficiencies were apparent in all groups in all sections.

Experience in Temlab seems to have no bearing on a subject's ability to answer these questions correctly, though teachers with primary education and no experience in Temlab did surprisingly well on some items.

(e) *OTHER RESULTS*

(i) Alongside the major results deduced directly from an analysis of the data obtained in the investigation, there appeared indications of other conclusions which would be very significant for education in developing countries. There are definite indications of the negative effects of rote learning. One instance of this negative influence is that local teachers show some improvement in the first five years of teaching but further development is inhibited by limited educational background. It would appear that, since short term successes are linked closely with the content of the material taught and the learning by rote at earlier stages, then the rate of application of new ideas, new methods, and experience is curtailed. The second instance occurs in the comparison between percentages correct on the Temlab items for the various groups. In some cases, where a greater percentage of the non-Temlab group answered correctly than did the Temlab group, it would seem that subjects are unable to apply their learning to situations other than that in which the fact was learnt. This reinforces the view that Temlab has become the object of rote learning, and does not necessarily lead to flexible creative application of basic mathematical thought processes.

(ii) Another byproduct is that the facility to handle the symbolism of the English language varies according to the subject's exposure to western education. This is indicated by the factor analysis of the Mathematics Understanding Test. One of the factors isolated seems to be a component measuring the subject's need to interpret symbols before performing the required task.

IMPLICATIONS OF RESEARCH TO EDUCATION IN PAPUA NEW GUINEA

(a) *EDUCATION FOR GIRLS*

It was found that the performance of local girls is much worse on the Mathematics Understanding Test than that of local males. In view of other research, it may be accepted that in general females do not do as well as males in numerical skills but do better in verbal skills. Notwithstanding, it is surprising that the performance of this particular sample of females should be so much worse than that of the males on a test of mathematical understanding with a high verbal content.

The most plausible reason for this is a cultural one. Even in some developed countries, the opportunity for education for girls is not as great as for boys, and the expectations of the society in which they live impose various forms of constraints on them. In Papua New Guinea, females are considered very inferior to males. They have no place in the village councils and are not considered in any decision making. Traditionally, their role is one of subservience to the male.

Many girls and women have broken away from their traditional role and have managed to hold places in secondary schools and university.

It is even difficult in some areas of Papua New Guinea to persuade village people to allow their daughters to attend school. This is no doubt the reason for the smaller number of local females in this study than would normally be expected in a sample of this size. This problem was recognised by the previous Director of Education in Papua New Guinea.

> "There is still a sex imbalance; consequently, there will be too few educated girls compared with the number of educated boys. Efforts are still being made to improve these ratios by propaganda, persuasion and even by the coercion of not providing school facilities if a substantial proportion of girls are not allowed to enrol. There is no indication that the problem will disappear although it does diminish as each area develops." (McKinnon, 1971)

Despite the tendency for the traditional attitudes towards women to break down, there still remains a negative attitude towards the achievement of girls in schools. Girls are just not expected to do well. They are not given any incentive to do well. They are merely tolerated in schools and expected to return to their village, marry and bear children.

Pidgeon (1970) quotes studies in which the expectations of teachers and parents appear to affect the performance of children. As some of these studies involved children from different cultures, it may be assumed that the same results of role expectation would occur in Papua New Guinea.

It is anticipated that as more and more girls throw off the inhibiting effects of their traditional background, and more gain success in various aspects of the community, the achievement of females in general will improve. This is not, however, to decry the homemaking responsibilities of the local women. It is important to remember that women, with their close personal contact with young children, are in an admirable position to create attitudes and encourage aspirations.

As the education system develops within the context of the developing nation, it is conceivable that more and more women will become teachers. In this position, they again will have an opportunity of influencing the attitudes and values of their pupils.

(b) *TEACHER EDUCATION*

Developments in the recruiting and training, both pre-service and in-service, of local teachers have taken place. Already a big advance has taken place in the raising of the minimum entry qualifications to Form IV and the extension of all training from one year to a minimum of two years. Increased recruitment at the secondary school level means there must be a greater number of children proceeding from primary to secondary education. It also means a much greater strain on the limited staff of training colleges.

Results of this investigation indicate that the developments in training which have already taken place have had positive effects for the subjects tested. These positive results should continue to raise the standard of the teaching of new recruits. It seems, then, that the immediate problem is concerned with the teachers who are already in schools. Many of these teachers have been the victims of the situation in which an urgent need for teachers persuaded various agencies to give limited training to people with minimal qualifications. The situation could be summed up in the words of the report of the Regional Symposium on the Inservice Training of Primary School Teachers in Asia, held in the Philippines in 1967.

> "These countries have had to resort to emergency or crash training programmes to produce as quickly as possible new teachers for the fast expanding school programme. As a consequence, there is rather a high proportion of unqualified or inadequately trained teachers in primary schools in many Member States who must be given regular in-service training courses to ensure that the quantitative expansion in education is accompanied by qualitative improvement." (p. 4)

Particularly in developing countries, pre-service training cannot serve a once and for all function. With rapid change taking place within the social, political and economic areas of the country, it is important that teachers are able to cope with this change and adapt themselves to acquiring new knowledge and discovering the means to teach it most effectively to the children in their classes. Adequate provisions should be made for all teachers to participate in the in-service training courses which are most suitable for them at their present stage of training and experience. The results of this investigation indicate that substantial in-service training is needed before the sixth year of teaching.

(c) *CURRICULUM REVISION*

The finding that experience in teaching Temlab bears little relation to a teacher's ability to understand basic mathematical concepts must call in question the whole philosophy behind the introduction of the Temlab programme. Certainly, the implementation of such a programme as a nationwide syllabus must be considered further.

One should ask "Is there any underlying reason for the result concerning Temlab experience and teacher's understanding?" The obvious answer is that Temlab experience does not help a teacher, and that is the conclusion I have reached, though I recognise the cogency of other interpretations related to Temlab content in the test, the verbal content of the test, the allocation of teachers to classes, the limitations or otherwise of primary school entry qualifications and the method of implementation of the Temlab programme.

An important issue, too, is the motivation for the change in mathematics syllabus. No one can deny that such a change is a courageous one but some (Lewis, 1968) would doubt the wisdom of its timing in relation to the present social and economic situation in Papua New Guinea. As Philp (1969, p. 280) points out, "any formal education system exists to serve the society in which it operates," and again, "this would suggest that, when one is designing curricula or planning a school system, there is need for a clear definition of the aims of the society and of the aims and objectives of education within these" (Philp, 1969, p. 281). The two principal motives for introducing the Temlab programme were to release the system from the cycle of mechanical teaching and rote learning about which a comment will be made, and to create a greater feeling of prestige amongst the local people. Knowing that, like many developed and other developing countries of the world, the children of Papua New Guinea were learning 'new' mathematics was expected to help Papua New Guineans feel better able to cope with the problems of nationhood in relation to the rest of the world. This latter motive, it is admitted, takes into consideration the political and social development of Papua New Guinea

The next point to note is the lack of continuity of the Temlab programme. The first three years of the programme were introduced in schools in 1968. The rest of the programme was not considered until the first three years had been revised. By May, 1973, five and a half years later, the programme for the first year was ready for distribution, that for the second year was in the hands of the printer and the revision of the third year programme was well under way. The delay in preparing subsequent material and the lack of continuity which ensued, has led to all kinds of frustrations on the part of the children, who have a completely different course for one to three years, then revert to the traditional course or cease to study mathematics altogether; teachers who teach years one to three with no certainty as to what direction the course is taking; and advisers who feel at a loss to help teachers gain the most from their experience with Temlab. The lack of determination of the upper limit of the course concerned many people. Another aspect of the development of the programme which has been of concern to a number of people is the continual introduction of new materials and methods.

Again and again, it seems that consideration of the Temlab programme calls for an examination of its relevance to the children who are expected to participate in it. Undoubtedly, when the Revised programme is handled well, the children are enthusiastic and respond well. This only highlights the necessity for the teacher to be well-trained and confident himself. It does not, however, overcome the problem of relevance for the child in the village school far removed from urban areas and with no desire or no hope of continuing his education past the primary school, or even till the completion of primary school. The programme as it is now, could limit the performance of a child who is not going to complete the course, in the skills which will form the basis of his ability to participate in the economic development of his village.

As might be expected, language is of considerable importance to the development of education in Papua New Guinea. There are indications that the ability of the subject to handle the English language well is partly dependent on the person's exposure to western education. New mathematics, unfortunately, makes definite demands on language ability. This is particularly disturbing at a time when local subjects are struggling to express themselves in a foreign language. The terminology alone may prove a handicap to children who are in the process of learning English as a second language. It is difficult enough to learn with understanding relatively simple words of objects and ideas associated with their life, without trying to associate unfamiliar words with abstract concepts. Admittedly, much can be taught without the use of technical names but in concept development, it is agreed that verbalisation is important.

The method of teaching the Revised Temlab programme is also very important. As indicated before, the enthusiastic, well-trained and confident teacher will be able to allow children through activity methods, to discover important mathematical concepts for themselves, but the enthusiastic, well-trained and confident teacher is the exception rather than the rule. Consequently, the teaching becomes as mechanical as it always was with the resulting disastrous effect of negative attitudes and lack of growth. The teacher, despite all the attempts to pretend otherwise, still retains a position of considerable importance in the communication of knowledge

Temlab, either in the original or Revised form, carries with it the danger of making mathematics teaching a very stereotyped rigid type of teaching. This must be avoided at all costs. Of course, it is recognised that teachers with inadequate training and little mathematical background of their own, feel more secure if they have a set framework for their lessons, but it is hoped that before the end of the next decade, teachers will be much better equipped than they are at present to teach as individuals to individuals.

There are two further points to consider. The first is the organisation and practical operation of a system of mathematics involving cards or similar aids. The success of such a scheme depends on the ability of a teacher to organise his class in groups and to organise the material necessary for each group. He needs to be able to supervise the class in their various activities and maintain the material in the kit so that continuous and continual use can be made of it.

Secondly, in view of the rapidly changing society, particularly in urban areas, a continual effort must be maintained to make the mathematics taught relevant to the lives of the children in schools. Certainly, there must be sufficient flexibility in the programme not only in mathematics, but in all subjects, to enable teachers to develop their ideas, as it is hoped that with the further improvement of teacher education and in-service training, the creative abilities of the teachers will be brought to the fore.

It may be, for instance, that in many of the village schools, basic numeracy is all that is needed. There is for some, however, a definite advantage in persevering with new mathematics. Differential syllabi may be needed at least as a temporary measure.

Since the existence of indigenous number systems forms an admirable starting point for the understanding of place value and multibase arithmetic, more attempts should be made to incorporate these indigenous number systems into local school programmes.

(d) *ROTE LEARNING*

Some of the effects of rote learning have been isolated by this study. They include the failure to understand what has been learnt, the inability to benefit from experience, the inability to apply what has been learnt to another situation, and the tendency to revert to methods of teaching which are themselves mechanical and meaningless.

While all these deficiencies which result from rote learning are important in the sense that they have negative effects, the main effect of limiting reasoning and creative thinking, is the most disastrous. It is in the promotion of deductive reasoning that mathematics can have a powerful effect.

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SECONDARY SOCIAL SCIENCE IN PAPUA NEW GUINEA DEVELOPMENTAL SUCCESS, IMPLEMENTATION FAILURE?

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Social Science is now a compulsory subject for all secondary and technical school students in Papua New Guinea in Forms 1, 2 and 3, and will be introduced into Form 4 next year. After next year History and Geography will no longer be taught in the schools.

Many of you are no doubt aware of the history of the development of the Secondary Social Science Project in Papua New Guinea. For those who are not, let me briefly sketch in the background.

The Project began in 1967 when a 'Social Relations Committee' was established to prepare a syllabus outline for a course in social relations and to consider problems related to its implementation. The next major step was taken in 1968, when Prof. James Ritchie of the University of Waikato, New Zealand, conducted an intensive survey of the Social Relations Syllabus and then submitted to the Director of Education a report entitled "A Social Science Curriculum". Included in the report was a summary of matters related to the organisation, implementation and nature of the Social Science course, as well as the syllabus itself. The syllabus was later modified by Professor Sol Encel and Dr. Dexter Dunphy of the University of N.S.W. and by officers of the P.N.G. Department of Education.

Work on the development of the curriculum was carried out by officers of the Curriculum Branch of the Department of Education, with the assistance of the Teaching Methods and Materials Centre of the U.P.N.G., which acted as the co-ordinating body for the project. From 1970 there was a full-time curriculum officer working on the project, and this number had grown to two full-time and one part-time by 1972.

In 1970 the Form 1 course was introduced on a trial basis into 10 schools selected to provide a sample of rural and urban, administration and mission, and boarding and day schools. This selection also provided a cross-section of highland, coast and island areas. Materials were developed and trialled throughout the year, and the course was introduced in Form 1 in all schools in 1971, with the Form 2 course introduced in 1972.

From an evaluation of the Forms 1 and 2 trials, it was decided to conduct pre-trials, as well as trials, for the Forms 3 and 4 courses, during which teachers in trial schools would be provided with a syllabus and a few basic background readings, but generally left to develop their student materials and present the curriculum according to their own interests and talents.

The rationale behind pre-trials was to enable teachers to participate more fully and actively in the writing of course materials. The Form 3 pre-trials began in 1972 and those for Form 4 in 1973. I will comment further on their success later in this paper.

The objectives of the Secondary Social Science course are:

1. to develop understanding in relation to other individuals, social groups and the society in which the student will function
2. to know and understand the central processes of society, particularly as these affect the development of the country
3. to learn skills of social enquiry and social action so that through an analysis and evaluation of social processes a student may increase his potential contribution to his country
4. to evaluate his growth as an individual in a changing society and at the same time lead him to a commitment of active participation in social life.

The curriculum has adopted a methodology of study drawn from the Social Science disciplines—History, Geography, Sociology, Anthropology, Psychology, Economics and Political Science. It emphasises the way in which each of these disciplines can help to analyse social problems, rather than the content of the particular disciplines.

Underlying the curriculum are three main categories of assumptions, related to the social context of Papua New Guinea, secondary education, and curriculum principles.

Without going into detail, let me outline some of the most significant assumptions in each of these categories

1. *Assumptions drawn from the social context of P.N.G.*

The curriculum is concerned with social change—its nature and characterics and its effects in P.N.G. and the rest of the world. The curriculum recognises that P.N.G. is undergoing rapid social change, and attempts to organise learning experiences in such a way that the individual secondary school student will be able to fit into this changing society when he leaves school. It was framed in terms of the educational requirements of a country whose people are mainly villagers, and for whom modern western society is not necessarily a suitable model.

2. *Educational assumptions*

The most significant assumptions here relate to the continuance of selection of students from the total of primary school leavers and a further reduction in numbers proceeding beyond Form 2. Thus the curriculum has to provide for two separate terminal years and for an increasingly select group of students who will become the educated elite and decision makers in much of the country's administration. In relation to teachers, Ritchie assumed that they would continue for some time to be largely expatriates from Australia, with a fairly high turnover rate. The latter is true, but the numbers of indigenous teachers are increasing rapidly and so are the numbers of non-Australian expatriates as a proportion of the total, and it would appear likely that this trend will continue.

3. *Assumptions related to curriculum principles*

The most important of Ritchie's assumptions in this field are:

1. there is a *spiral structure* in the development of the curriculum, i.e. concepts introduced early in the curriculum are developed throughout the four-year course;
2. the spiral structure of content will cycle around an *individual's* experience;
3. "learning to learn" is to be as important as learning facts, generalisations, theories, methods, and approaches to problems.

The outline of the course, with its themes and emphases in each year is as follows.

YEAR 1

Theme: Similarities and differences

Emphasis: Contemporary Papua New Guinea, with some comparative case studies

Topics: Individual, group and community
Self study
Family
School
Village
Local study—Popondetta
European culture as seen in the European in Papua New Guinea

YEAR 2

Theme: Change and development

Emphasis: Traditions and origins of contemporary problems and developments

Topics: Aspects of personal development
The changing family
The changing community
Aspects of national development:
 In Papua New Guinea
 In Indonesia
 In Japan
The world powers

YEAR 3

Theme: Adaptation

Emphasis: Man's relation with his environment and increasingly his man-made or influenced environment

Topics: The early development of man
Contemporary man in his environment
Society as a system
The rise of urban centres
The impact of technology
Modern urban centres
Problems of urban society
Problems of rural society

YEAR 4

Theme: The modern world

Emphasis: Established trends and projected developments

Topics: Organisation of contemporary P.N.G. society
Man, his environment and the future
Development of ideologies
International relations
Culture
The village in modern society
The future

In stage 1 of the project, the materials developed are of three kinds:

1. *Teacher's Guide. Part 1:* background readings and points of view related to the content of the topic—prepared especially for the teacher.
2. *Teacher's Guide. Part 2:* a translation of the statements in Part 1 into detailed suggestions for classroom teaching and learning experiences.
3. *Accompanying Material:* a range of teaching and learning materials, from slide/tape presentations, sets of slides, tapes, picture sheets, maps, diagrams, case studies, readings, etc.

In Stage 2, the Teacher's Guides Parts 1 and 2 are combined, and there is much less detailed guidance given to the teacher in the way of teaching and learning experiences.

Now to turn to the main part of this paper—has Secondary Social Science been a developmental success and an implementation failure?

If measured in terms of the quantity of materials produced and the apparent quality of those materials then Stage 1 of the project would have to be regarded as a developmental success. This is hardly surprising when one considers the amount of time and money involved—time not so much in years but in man-hours of people in Universities, teachers' colleges, schools and departmental headquarters.

I think it would be fair to say, and I must point out that I had nothing whatsoever to do with the development of Stage 1 of the curriculum, that Papua New Guinea is amongst the leaders in world education in the quality of its Social Science course—certainly it stands as an example to most Australian states in this respect, for having made the decision that a social science course was to be developed, and that the main reason for its development was the desirability of a course in social education for all secondary school students, the Education epartment, leaving aside the petty and not-so-petty squabbles that characterise all institutions where people have their own wheelbarrows to push and their own empires to build, went ahead and devoted a large amount of money and drew on a great deal of varied expertise to ensure that what was developed was what was wanted by the designers and needed, as far as they could ascertain, by the students.

Compare this, for example, with the rather ludicrous situation in N.S.W., where, after over five years of so-called curriculum development, practically all that exists is a set of headings and a statement of aims and objectives that together supposedly represent a social science curriculum. Further, this curriculum is still not operational in more than a few high schools in the state.

I would say that a major success in Stage 1 in P.N.G. was the fact that the course got off the ground, got into the schools despite the opposition of entrenched subject groups amongst the expatriate teachers, and now exists in a tangible form that allows the teacher who is totally new to the course to read the background to the content of a particular topic, analyse the concepts and inter-relationships involved in it, survey the materials he has to teach with, and choose for himself whether to adopt the approaches suggested or develop his own.

This detailed approach to the teaching-learning situation is one that had been criticised frequently by both teachers and non-teaching commentators. What both groups fail to realise is the simple fact that many teachers, particularly those new to a subject such as this which is foreign to both their academic and cultural backgrounds, simply do not have the ability to be able to develop their own course of study from a bare outline. Others do not have the inclination, and most simply do not have the time to spend on creative and innovative curriculum development. Most of all, the critics choose to ignore the word 'guide' in Teacher's Guide, and make a mental substitution of 'bible' or some other proscriptive word. Curriculum Branch personnel, in in-service courses and advisory visits, have stressed from the beginning that these are guides only, and have actively encouraged teachers to depart as much as they like from the guides while still keeping within the overall conceptual framework of the course.

Yet it is in this very area—that of innovative and imaginative teaching—that the Social Science course might be termed an implementation failure. One cannot say with certainty why this is so—why teachers choose the easy way out and refuse to budge from the detailed guidelines set down, but the following are, from personal observation and from discussions with other observers, some of the reasons:

1. Teachers new to the country and/or the subject are initially feeling their way—many teach the course only once and hence never get beyond this stage.

2. Some teachers, through lack of time or interest, find that following the Teacher's Guide to the letter is the easiest way out.

3. In many schools Social Science in Form 1 is timetabled in such a way as to take up all the bits and pieces of teachers' time left after the rest of the timetable is finished. This often results in the allocation of Social Science classes to teachers with absolutely no background in any of the social sciences who can do little else but pursue a rather mechanical and non-understanding approach to the subject.

4. Some secondary inspectors have insisted that teachers follow the guides to the letter. (In P.N.G., we do not have subject specialist inspectors—inspectors are supposed to be able to assess teachers and give them advice across the whole range of subjects in the school.)

5. Many headmasters have insisted on all classes in a year having identical tests, thus forcing them to follow the same course.

One particularly disturbing feature of the implementation of the Social Science curriculum has been the tendency of expatriates, wedded to the traditional disciplines of History and Geography, to regard Social Science as "waffly rubbish", or, as one teacher with two months' experience entitled a paper he presented at an in-service training session last year, "an amusing brand new toy". What sort of professional integrity exists in the teacher who, not content with sounding off in the staffroom, continually tells his Form 1 class that Social Science is "a load of rubbish" and what they need to learn is "some solid facts"—no doubt a detailed knowledge of the Wars of the Roses or the techniques of trench warfare in Flanders rather than an understanding of the functioning of their own society—a rather sad commentary on the inability of many teachers to understand what social science is all about and to condemn it out of hand before even giving it a trial.

The obsession with rote learning of facts is, of course, reinforced by the test and examination mania which bedevils our education system. For years students and their parents have been fed on the cargo cultism of "jump through the right hoops and you will get a good job"—the right hoops, of course being those formed by the marks gained in formal tests and examinations. It is now becoming painfully obvious that, in this country at least, the pot of gold will not necessarily lie at the end of the educational rainbow, even the magic Form 4 certificate, and that education for living is something of value in its own right. This is, no doubt, partly a result of the introduction of the sophisticated approach of Social Science in a country not yet fully aware of the pitfalls of western-style formal education. Still one of the most common questions I am asked in the classrooms of schools that I visit is "what sort of job can I get by studying Social Science?"

Lest I be misunderstood and seem to be concentrating too much on the failure aspect of my topic, or lest I be accused of excessive and unfair criticism of teachers, may I make the following points in balance:

1. There *are* a great many interested, creative, dedicated and satisfied teachers of the subject. Most expatriates seem to enjoy it the second time around, and the local teachers are almost unanimous in their liking for it.
2. There *are* many things wrong with the course. Despite the method of its preparation, there are topics which were trialled inadequately or not at all, topics which have become out of date, and topics which are just plain boring.
3. The focus on the individual and the familiar surroundings in Form 1, which is the most criticised section of the course, might be very good in academic sociological and educational theory, but is it what kids want? There are many teachers who would argue, from a sound acquaintance with children of this age, that what they are more interested in is the distant, the unknown and the exotic.
4. Inspectors have sometimes played a negative role in the successful implementation of the course by teachers, through insisting on approaches to both teaching and assessment which are contrary to the philosophy of the course.

Let me now turn to Stage 2 of the project, that is, Forms 3 and 4, with which I have been closely connected in both the developmental and implementation phases.

Stage 2 was mounted on a much smaller budget, in fact half at $10,000 for each year, than Stage 1. In addition, the Teaching Methods and Materials Centre of the U.P.N.G., which had been heavily committed to Stage 1, withdrew from the Project after the pre-trial year of Form 3. The result was an obvious need to cut down on the money spent on materials, and a lack of manpower available to work full-time on curriculum development—since the beginning of 1973 there have been only two officers in Curriculum Branch working on the project.

This meant that there was, ideally, a much greater need for teachers to participate in the developmental process than before. Did this happen? In a simple answer, No.

In 1972, the pre-trial year for Form 3, six high schools were involved. These were selected from the 10 trial schools in Stage 1 and were to contain interested teachers. The idea of the pre-trial year was to supply teachers with an outline of the aims and objectives of the course, with some background materials, and to allow them free reign to develop the course as they saw it. Since nearly all the teachers involved in this year were interested, competent and experienced in Forms 1 and 2, the year could probably be judged to have been successful.

In 1973, the trial year, the same six high schools continued and to them were added the seven technical schools/colleges of the Territory. Most of the teachers who had been participants in the pre-trial either moved from the high schools or were not put on to the classes trialling the course. They were replaced by teachers who were given Form 3 as a matter of normal timetabling, and so we found that they ranged from the interested and competent to the positively disinterested and even antipathetic. In the case of the technical schools and colleges, most of the teachers had no knowledge of, let alone experience in, Forms 1 and 2. I do not state this as a criticism of these teachers, many of whom made a valuable contribution to the trial year, but their contribution would no doubt have been better had they been aware of the preceding two years' course

1973 was also the pre-trial year for Form 4. The pre-trials were held in the same six high schools as the Form 3 trials and consequently were subject to the same limitations. Further, there was insufficient time available to the two curriculum officers working on the project to develop more comprehensive materials than would normally be the case in a pre-trial year in order to compensate for these problems. In terms of topics the Form 4 course is far more difficult for teachers to find background material and they are less likely to have had a background in the topic areas in their academic training. Such topics as "the Organisation of Contemporary P.N.G. Society", "The Development of Ideologies", "International Relations" and "Culture" required an amount of preparation beyond the time available to most of the teachers, and beyond the resources available to them as well.

Frequent conferences amongst the teachers involved, together with members of Curriculum Branch, could have helped solve these developmental problems in Forms 3 and 4. Unfortunately, because of lack of funds, this was possible only in the case of teachers in the Port Moresby area, and even this was thwarted by the unwillingness of one high school principal to release one teacher during school time. I was able to make personal contact with teachers and students outside the Port Moresby area once or twice during the school year, but this was an unsatisfactory substitute for combined meetings of teachers.

Despite these problems, the first term material which has been introduced into all high schools in Form 3 this year has met with a generally enthusiastic response from teachers and students. Teachers particularly comment that the course is better than Forms 1 and 2, but this may well be simply because the topics covered so far lean more towards the traditional disciplines of history and geography, rather than because of the quality of the material produced.

Again we find the same arguments and complaints arising from expatriate teachers who have not taught here before, or who have not taught the subject before, and whose horizons sometimes end with the English General Certificate Examination or its counterpart in East Africa or Australia. It is too early yet to ascertain whether their approach to teaching the subject will embody the concepts and methodology envisaged by the course developers —my colleagues and I are apprehensive that the temptation for teacher- and subject matter-oriented teaching will prove too great for many of the expatriate subject specialists. (One notable exception to the generalisation I made above about the new expatriate teacher is the graduate from Canberra CAE—it is interesting to contrast someone who has been trained in the teaching of social science and who understands its rationale and methodology with the majority who have not and do not.)

In the original thinking about the project, it was envisaged that there would be in-service courses held throughout the country for teachers, students, headmasters, district inspectors, and members of university and teachers' college staffs. This was possible to a certain extent in the case of Forms 1 and 2, but lack of finance has prevented anything of a really worthwhile nature being done on a large scale for Forms 3 and 4—in fact, it has not even been possible to arrange an in-service course for trial teachers prior to their commencing teaching the course.

The potential value of such a course must be fairly obvious when we look at the breakdown of teachers engaged in the Form 4 trials this year. Of the 20 teachers involved, only one has been involved in the trials since 1970. Seven were involved in the Form 3 trial last year and of these only one was not new to the subject. Two have taught Forms I and 2 before leaving 10 who are experiencing social science for the first time in the final year of a four-year course.

Looking at the course overall, we must ask, "Have we achieved the objectives of the course?" The answer is simply that we don't know, as there has yet to be mounted a large-scale evaluation of the outcomes of Stage 1. Feedback from trial teachers in Stage 2 has indicated that, in general, the aims for each topic are realistic and are being achieved, but this does not mean that we have necessarily produced the thinking member of society that we are hoping for.

In conclusion, and reverting to the title of this paper, I would answer the question posed by saying that, in my judgement, there have been elements of success and failure in both the developmental and implementation phases. Materials have been put into schools and have been found wanting by most students and teachers. Form 1 is widely condemned as being too boring, and the number of people involved in Stage 2 of the project has not permitted the same breadth of knowledge and experience to be used as in Stage 1.

On the success side, we see a course of study which is comprehensive, generally well-written and educationally sound, and which provides for the teacher, however inexperienced, a set of background readings, lesson outlines and student materials which will allow him to enter the classroom with some degree of confidence about the outcome of his lessons.

The implementation failures have come about through a lack of understanding on the part of some teachers, headmasters and inspectors as to what the course is trying to achieve and how it is trying to achieve this, an antipathetic and sometimes antagonistic attitude on the part of many expatriates, and a lack of imaginative and innovative teaching by some teachers, indigenous and expatriate alike.

Against this we must rank the general acceptance of the Form 2 and particularly the Form 3 course, the almost universal acceptance of the whole course by the indigenous teachers, and, in most cases where the teacher's attitude and prejudices do not militate seriously against it, acceptance and enjoyment by the students.

And this, I would suggest, is the most important point of all.

THE PLACE OF AGRICULTURE IN THE SCHOOL CURRICULUM

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Most of the people in developing countries live in rural area, and in most of these countries rural production is the economic wealth base.

It is therefore to the improvement of rural production that these countries must chiefly look in order to make economic progress and to raise the standards of living of the people.

It is probably for this reason that agriculture has been introduced into the school curriculum in many developing countries. The recency of this development is obvious in the following table which shows the years of inauguration of school agriculture courses in some islands and territories of the Pacific region:

Navuso Agricultural School, Fiji	1924
Ratu Kadavelevu School, Fiji	1958
Guam (Mariana Islands)	1960
Vunamami School, Rabaul, P.N.G.	1964
French Polynesia	1965
American Samoa	1965
Ponape Agriculture and Trade School, Carolines	1965
Papua New Guinea	1966
British Solomon Islands Protectorate	1967

While the economic dependence of these countries on rural production provides an obvious reason for their interest in agricultural education it is not so obvious why the *schools* have been chosen as the vehicle for this education. Perhaps one reason is the fact that the schools represent the most widespread educational facility in such countries, and are seen as an important agency for the dissemination of ideas considered to be of national importance. Perhaps one factor is optimism in the possibility of affecting attitude change in the younger generation more readily than might be possible with an older more conservative generation.

The level at which agriculture has been taught has tended to be determined largely by the age at which most children leave school. Where most of them leave at the end of primary schooling, agriculture has been taught in the upper primary school; but where the majority of children stay on into the junior secondary school, agriculture has been taught at this level where it is likely to be more successful.

Nevertheless, with a few notable exceptions, the history of school agriculture in developing countries has been a most disappointing one. The subject lacks prestige in the eyes of the pupils and parents alike, far from strengthening the interest of young people in rural occupations, the effect of school agriculture often seems to have been the reverse—to strengthen the determination of pupils to do all they can to escape from rural occupations and to find some other employment.

Many contributing factors seem to have been responsible for this situation:

1. The paucity of teachers who have been trained to teach agriculture properly has undoubtedly acted as a serious limitation to the success of this subject.
2. In the absence of a suitable syllabus with variety and intellectual challenge, school agriculture has often consisted of little more than compulsory periods of manual labour in the garden, often in the hot sun. This has naturally given the subject a poor image in the eyes of the students who compare it with other subjects studied by their colleagues indoors.
3. Lack of an adequate time allocation in the school programme has meant that teachers have not had enough time to do anything effective with this subject. The prestige of school agriculture can never be high when it consists merely of one or two hours gardening each week.
4. But the most powerful factor operating against the success of school agriculture is that it is seen by students and parents as a preparation for a return to subsistence living on the land.

The prestige of a school subject in the eyes of students tends to depend heavily on its vocational significance. A subject that is seen as a preparation or part preparation for a well-paid occupation will enjoy high prestige. Thus, school agriculture in Australia has high prestige in those schools where it is a matriculation subject or where at least one segment of local agriculture is a very profitable occupation. But it has low prestige in schools where its obvious significance is a return to subsistence agriculture, for in almost all rural communities in the world, low social prestige is accorded to subsistence agriculture as a way of life.

This situation is unlikely to be changed by the provision of well-trained teachers, an imaginative syllabus or a generous time allocation in the weekly programme, for it is due to deeply entrenched community attitudes to subsistence living.

Therefore to the question, "What is the place of school agriculture in the curriculum?" the inevitable answer in many developing countries may well be "As a separate school subject, it has no place".

Even in those countries where this pessimistic judgement appears to be a completely correct one, two factors demand a re-examination of the situation:

(a) The fact that the majority of students whose homes are in rural areas will have to spend the rest of their lives engaged in rural pursuits and will be unable to find employment elsewhere.

(b) From a national point of view it is highly desirable that such students be given some understanding of the means whereby agricultural production can be improved.

Because school agriculture has often been unsuccessful when offered as a separate school subject yet some understanding of it is thought to be highly desirable, interest has turned to some other ways of introducing it into the curriculum. Several interesting new developments can be described.

An increasingly popular solution to this difficult problem is to include some agriculture in a general science course. Such action requires a restatement of objectives in general science to accommodate such additional material; it also requires that the agricultural material be subjected to a highly selective process in order to achieve its aims without overloading the science syllabus.

In 1973 agreement was reached on the following objectives for a basic science course in Fiji:

A. *MAIN OBJECTIVES*

1. To contribute to the mental development of students by giving them experience in the processes of scientific thinking in problem solving situations and by encouraging independent thinking.
2. To develop various attitudes such as:
   —objectivity—honesty in assessing evidence, critical attitude to conclusions, willingness to re-evaluate evidence.
   —concern for conservation (wide use) of natural resources.
   —concern for quality of life insofar as it depends on understanding one's environment.
3. To develop the students' understanding of their present environment and their possible future environment, particularly the land and its products

B. *SPECIFIC OBJECTIVES*

1. To provide some understanding of the basic biology of organisms and communities.
2. To develop understandings and attitudes as far as possible through participation in group practical work and experiments.
3. To lead the student to understand the workings of his body and some important principles of hygiene and human nutrition.
4. To lead students to understand the problem of the balance between populations, including human populations, and land and sea resources.
5. To develop an understanding of the need for conservation of natural resources.
6. To provide an understanding of how man uses the natural resources of the land and sea for good production, and the need for care in preserving and developing these sources of food production.

It will be noted that objectives A3 and B6 make adequate provision for the inclusion of agricultural themes; but it is when such objectives are translated into specific syllabus content that difficulties may arise, for so much depends on the background and training of the syllabus writers. A special consultative group meeting in Fiji in May, 1973, suggested the following agricultural content of such a syllabus:

choosing types of plants and animals
altering soils
managing growth—through nutrition
through disease control
through climatic control
managing production

but it was assumed that this would be preceded by the basic biology of organisms and would be followed by ecosystem biology in which the implications of agricultural practices would be discussed.

It will be interesting to see whether this and similar trends in other countries result in the development of a science syllabus which successfully integrate physical and biological science with some fundamental concepts in agricultural science.

It is worth noting that agriculture forms an important part of a subject called Rural Studies which has infiltrated into the secondary curriculum in the United Kingdom. However the primary motivation for the introduction of this subject is the psychological and social needs of children rather than political considerations based on the place of agriculture in the national economy. In a working paper "Rural Studies in Secondary Schools" published by the Schools Council in 1969,[1] the subject is justified by two criteria, namely:

"(a) The care of growing plants and the keeping and study of animals meet a need that is fundamental to all human beings. The satisfaction of this need consequently enriches the personality and provides an acceptable formative influence on all pupils. In brief, unless they have these experiences, boys and girls will grow into less well informed and less mature adults.

(b) The subject deals in detail with the physical and social aspects of the environment and these are certainly the most constant, and probably among the most important educational influences to which young people are subjected."

In an influential paper[2] read at the fifth Waigani Seminar, McClymont argued a strong case for the whole curriculum to be directed at developing an understanding of the land and man's relation to it and dependence on it. McClymont's main motivation in this paper is the urgent need to provide education that is relevant to the future life of the majority of the children. It is not enough to include one subject that is relevant to the needs of the pupils, but the whole curriculum should be cast in this mould. McClymont visualises an integrated physical science, biological science, agriculture and social science course in which the central aim should be "to teach about land as a system involving flow of energy from sunlight to plants to animals, with man as a harvester of both plant and animal energy; the cycling of nutrient elements between the soil, atmosphere, plants and animals including man; and the interdependence of all forms of life primarily through providing food for each other, and the resulting phenomena of nutrition, disease and population regulation, and their implications for man in terms of agriculture, conservation, diet, hygiene and population control . . . The teaching should in the terminology of current syllabuses, integrate nature study, science (especially biology) and aspects of geography, social science, hygiene and agriculture with one another and with local ecological, cultural and economic factors".[3]

A major value of McClymont's paper is that it has provided much needed guidance for those who are at present reshaping science programmes and including in them elements of agriculture and agricultural ecology. But it may eventually have a much wider influence in curriculum construction when the need for greater relevance in secondary curricula becomes a more urgent issue.

There is reason to doubt whether the inclusion of agriculture in general science courses will prove to be as effective in providing the provocational preparation of future farmers so much desired by governments. It is possible that the following limitations will always operate:

(a) at best the agricultural content of science courses can consist only of a study of general principles with little or no opportunity for these principles to gain meaning by translation into practical husbandry.

(b) because of the scarcity of teachers trained in agriculture, the teaching of these topics must often be in the hands of those who know little about the subject.

It is for these and other reasons that much interest now centres on the innovative approach of the Modern Studies course now in the process of development and trial in Fiji.

Initial steps towards developing this course had their origins in discussions centred on the following needs of pupils.

1. The need to demonstrate the relevance of the curriculum to the present and future needs of pupils.
2. The need to provide pupils with practical activities which would be meaningful if centred on real-life situations. These activities were initially called "situation experiences".
3. The need to introduce children to some of the fundamental economic concepts of a modern cash economy.
4. The need to promote the development of the rural sector.

The main purpose of the Modern Studies course is to provide links between schooling and life activities in the locality, including their economic aspects. The course is to be viewed as a vehicle for demonstrating the relevance of the curriculum for modern living in Fiji. As far as possible, understandings and skills are to be developed through practical activities and projects in which students are actively involved.

The course is offered in the third and fourth forms and consists of two strands. The compulsory basic topics are used to introduce students to certain universal economic and commercial understandings and skills that have application in avenues of economic development.

The projects form the second strand of the course and will eventually embody some degree of choice according to the locality. The main aim of these projects is to provide opportunities for students to study and participate in projects of particular relevance to their environment.

The first two projects are at present under trial in selected schools. The projects have the following characteristics.

1. Although both are rural—a broiler chicken project and a vegetable growing project—they are suitable for schools located in either urban or rural centres.

2. Because many teachers supervising the projects will have had little or no agricultural training, the teachers' guides have been written in considerable detail. They provide background scientific information, suggested sequence of lessons and activities, full lesson notes and technological instructions; as well, the teacher's guide attempts to stimulate the interest of the teacher.
3. For each project there is also a pupil's pamphlet. These are written to be readily understood, are fully illustrated and contain lists of suggested activities, questionnaires, drawings to be completed and so on.
4. Although the first projects are organised on a group basis, there is ample provision for pupil participation in the practical part of the project.
5. Both projects are used as vehicles for explaining the modern scientific approach to plant and animal production, both deal with economic aspects of such production and both draw heavily on concepts developed in the general science course.

The modern Studies course is certainly an exciting development. It remains to be seen whether the projects are too demanding on the supervising teachers, whether pupil interest in the school projects is followed by some attempts to develop larger projects in the villages and whether the projects are at all successful in changing attitudes to traditional agricultural practices in the villages.

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POWER OVER THE ENVIRONMENT—AN ATTITUDE TO THE WORLD

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Science teaching is relatively young in the evolution of a formal school system in Papua New Guinea. A "natural science" syllabus had existed in the primary school programme for a long time prior to the development of the present Three Phase Primary Science (T.P.P.S.) programme in the early 1970's, but had been sadly neglected or completely ignored by the teachers, and high school science dates back to about 1960 when the Alternative Science Syllabus for N.S.W. was taught in a few schools, to be first examined at Intermediate Certificate level in 1963.

Science teaching is regarded as an important component of formal school programmes all over the world, and there has been important focus on science as a major facet of the programmes for a developing country. This focus is typified by the attention paid to science teaching by the then Director General of UNESCO, Adiseshiah, in his Camilla Wedgewood address in Papua New Guinea in 1965 (Adiseshiah, 1965).

In his discussion on the purposes of science teaching he claimed that its aim should be to introduce students to that innovative mindedness and capacity for inventiveness and experimentation, so urgently needed in the world—in other words, an attitude development aim.

Most of the major science curriculum projects throughout the world have included attitude development in their aims, fairly typified by Arnold Grobman's statement about the objectives of the Biological Sciences Curriculum Study in U.S.A.:

> The goal of enquiry instruction is the production of informed citizens who raise purposeful questions about their world, who have ability to evaluate rigorously the answers that are proferred to their questions; and who can make hard and intelligent decisions (p. 292).

In discussing the contribution that science education can make to the world, Rowe (1970) stresses an important attitude to fate control:

> Perhaps the biggest contribution science makes to western societies is its emphasis, borne out by the way western peoples have absorbed the philosophy, upon intervening in one's own future . . .
>
> For children in any culture who grow up in environments marked by passivity, governed by superstitions, bound by fear, empty of dreams or ruled entirely by forces outside themselves, science has something special to say . . . (11-1-1).

She claims that prediction rests on belief that events are not totally capricious, and that what one does to a system makes a difference on how the parts acts.

Burkman (1970) is another supporter of the concept that an important function of science education is to bring about a change of attitude from fatalism to a positive view of man's ability to deal with his environment. He sees this attitude of power over the environment as important for the educational programmes of developing countries.

That these views are shared by the framers of the formal education programmes in Papua New Guinea is born out by the stated aims of the Papua New Guinea high school science syllabus, which include attitudinal components in four of the five objectives listed.

The aims are to develop in the students:

1. an awareness of, interest in and curiosity about the natural phenomena of his environment, and a commitment to seek a scientific explanation of these phenomena;
2. an understanding and appreciation of his relationship to his environment and confidence in his ability to affect changes and improvements in the environment;
3. an understanding of a selection of significant scientific facts and theories, and the ability to apply them in relevant situations;
4. his critical thinking ability, and a reduction in tendency to adopt opinions based on unsupported or unreliable evidence;
5. an understanding and appreciation of the methods of science, and the past, present and possible future contribution of science to mankind.

Like most of the rest of the world, however, Papua New Guinea has failed to do anything about attempting to evaluate whether the attitudes are being successfully achieved. If they are not being achieved; then the formal education system is not producing a crop of educated people with the positive type of attitude needed for development. If they are being achieved in the students, what about the people who do not have access to the formal system?

The research reported in this paper was a pilot study to attempt to develop an attitude measuring instrument which could be used in the cross-cultural, multi-lingual situation in Papua New Guinea, and obtain a numerical assessment of attitude related to the attitudinal aims implicit in the science syllabus stated objectives. It applied a technique of defining the behaviour expected of people holding the specific attitude and using the defined behaviour to construct multiple choice items for an attitude instrument.

SCIENCE AND CULTURE

The attitudes that people have are derived from the belief systems of the culture of the society in which they live, and although there is still much argument on the topic, science can be considered to be part of the culture of any society, however simple.

Malinowski (1948) proposed that no people, however primitive, lack religion, magic, scientific attitude, or science, but that science is related to reason and observation, while magic is related to what he called the "domain of unaccountable". This view is supported by Levi-Strauss (1966) and Lessa and Vogt (1965). Lessa and Vogt consider that it is errors in correlating irrelevant causes with particular outcomes, which leads the "primitive" to magical acts and beliefs (p. 394).

The "domain of the unaccountable" exists even in advanced societies, but its extent has been reduced through the application of science and technology. Scientists make the same sort of errors in correlation every day as primitive people do, but they are more likely to detect such errors due to the consistent flow of communication not available to isolated, simple, societies.

Cargo cults have been described as a result of the disturbance of deep seated beliefs by the intrusion of modern technology from outside, and could be considered as due to such errors in correlation. Lawrence (1964) points out that the Madang cargo-cultists were unable to regard "cargo" as the product of human endeavour and skill, incessant struggle, experiment and achievement of the independent intellect, but in their view it was knowledge revealed by special deities (p. 23).

The writer takes the position that science is the use of human intellect to establish models of explanation for natural phenomena from empirical observation, and from mental manipulation of such observations, and that in this sense, the ethnoscience of folk communities and "modern science" in the metropolitan world sense have common ground.

Very little is really known about the scientific and technological aspects of Papua New Guinea culture, despite the work of anthropologists, and the recent focus on ethnoscience.

Ethnoscience received considerable attention at the 1970 A.N.Z.A.A.S. conference, at a symposium on structure and Nature of Education for Science and Technology, where is was considered that the ethnoscience of the pupils can play an important part in the classroom (Andrews, 1970).

The ethnoscience of a community is one of the factors which affects the attitudes of its members, and these in turn influence attempts to alter attitudes, such as through the formal school system. The importance of the influence of folk attitudes on the teaching of science in developing countries has been recognized, as in the U.N.E.S.C.O. Report of the Advisory Committee on the Application of Science and Technology to Development (U.N.E.S.C.O., 1970, para. 17):

> Whether the education of future scientists and technicians, of a more scientifically oriented general public, or both, is the concern all such attempts must include an examination of the traditional world response and of the extent to which traditional attitudes, basic assumptions and concepts are accepted and used by the school population in everyday life.
>
> The traditional world response may be the source of particular difficulties for school children in their learning of western science. Also it can profoundly affect efforts to use school science as a first stage in the education of scientific and technical personnel.

Stone (1967) was concerned about the developments in high school science in African countries, particularly the Introduction of overseas science curriculum projects such as Nuffield and American projects, and emphasised the need for diverting some of the funds devoted to the promotion of such projects in Africa to the development of research into the intellectual backgrounds in which they are to operate.

Stone claims that the African pupil is already a member of a society coping with the world in its own way, with its own basic assumptions, causal agents, concepts and attitudes, usually radically different from Western science, but which work, in the sense that they have enabled a community to respond to and survive in its environment. To be effective, science teaching in such countries should be thought more as an instrument to affect the terms of reference and outlooks that future members of the society will accept and use.

THE PROBLEMS OF ATTITUDE MEASUREMENT

The importance of attitudinal components in the aims of science curricula has been well recognized. Folk attitudes, derived from the ethnoscience of the culture, which already exist in the communities of developing countries such as Papua New Guinea, affect the kind of attitudes which may be the outcome of the imposition of a formal science teaching programme in the school system. Although the importance of attitudes has been recognized, the difficulty in developing attitude measures has resulted in few attempts to measure them.

The difficulties in attitude measurement in metropolitan countries are large enough. In Papua New Guinea, with its multitude of language and cultures they are legion. The 700 different languages are distinctly different in structure from English, are based on entirely different cultural premises, and except for a few that have recently been converted to a written form, non-written.

The difficulties of translating words from one language to another are well recognized, as pointed out by Malinowski (1966) in reference to Trobriand language and culture — in order to reconstruct the meaning of sounds it is necessary to describe the bodily behaviour of the man, to know the purpose of his concerted action, as well as his sociology.

In examining Malinowski's Interpretation of Trobriand culture from the point of view of linguistic formulation, Lee (1968) came up with the conclusion that interpretations of reality are related to the code system of the language:

> a member of a given society not only codifies experienced reality, through the specific language and other patterned behaviour characteristics of his culture, but that he actually grasps reality only as it is presented to him in this code (p. 329).

This view is supported by Whorf (1968), who sees language as being dissected along lines laid down by the native language of the observer. All observers are not led by the same physical evidence to the same picture of the universe, unless their linguistic backgrounds are similar or can in some way be calibrated.

The common attitude measuring techniques which have been tried in other parts of the world are very difficult to translate into the Papua New Guinea situation. One typical technique is to frame a set of abstract statements and ask respondents to state to what degree they agree with the statements, such as "strongly agree", "agree", "disagree", "strongly disagree". The semantic differential technique is another device which has been used.

CROSS CULTURAL STUDY OF VALUES INVOLVING INTERVIEW AND TRANSLATION

One successful study in a cross-cultural, multi-lingual situation in the affective domain was the Kluckhohn and Strodtbeck (1961) study of values on five Indian, American and Spanish American communities in the American west. In this study an instrument was developed in which concrete situations were posed, together with concrete statements postulating alternatives of value orientations which the respondents were asked to rank in order of preference. The instrument was prepared in Spanish, Navajo, Zuni and English versions. The instrument was administered in interview-translation situations involving the assistance of an interpreter.

One of the value orientation posed in the Kluckhohn and Strodtbeck study is one they called the "man-nature" orientation, for which they postulated a three-point range of variation, namely "subjugation-to-nature", "harmony-with-nature", and "mastery-over-nature".

Although considerable argument can be advanced as to whether the latter is fully desirable in the modern world, it is this orientation which is aimed at by the teaching of science—the attitude that what one does to a system makes a difference on how the parts act (Rowe, 1970).

The Kluckhohn and Strodtbeck instrument consisted of 22 items which took about two hours to administer. Two hours was considered about the limit of concentration for interviewer and interviewee. Its success in the study of values, and its use of posed concrete situations rather than the use of abstractions, suggested a technique for developing an attitude instrument.

RATIONALE

People possess a set of values which is determined by the interaction between the individual and the natural and social environment in which the individual lives. This value orientation is manifested in the attitude held to circumstances in daily life. The attitude is given overt expression by either verbal statements about choice of action or by actual choice of behaviour when situations arrive in daily life.

Although the actual choice of action does not always agree with the verbal expression, the latter is the most practical way available to the researcher for assessing attitudes.

The man-nature value orientation defined by Kluckhohn and Strodtbeck (1961) is seen as giving rise to a continuum of attitudes from negative at one extreme to positive at the other.

A person holding a positive attitude is defined as a person who believes, or has faith in the susceptibility of the universe to human ordering and understanding (Kimball, 1967-68).

Five objectives were established to provide the basis for items in the attitude measure:

1. When faced with a situation in which it is proposed that an explanation of some natural phenomenon be sought, or information gathered about it through the avenue of observation and investigation, the person will accept observation and investigation as a proper and important method of seeking such explanation or information;
2. when posed with situations in which it is proposed that knowledge of the environment can be applied to manipulation of the environment for man's benefit, the person will accept that such manipulation is possible and may be desirable;
3. when faced with examples of technology, and asked to accept man's role in such technology, the person will accept that such technologies result from man's efforts with knowledge gained about natural phenomena, and not from some "magical" source unrelated to human effort;
4. when faced with situations in which a cultural model is challenged, the person will accept that such models can be tested by experiment and observation, and be willing to subject the model to such testing;
5. when faced with a situation in which a cultural model has been challenged by experiment or observation which has produced evidence which contradicts or conflicts with the model, the person will indicate willingness that the model should be modified in the light of the evidence.

A person who has a positive attitude is expected to respond to the majority of items in the instrument in the manner prescribed in the objectives above. A person who has a negative attitude is expected to respond in reverse fashion.

THE STAGES IN DEVELOPING THE INSTRUMENT

The original intention was to have each item stem consist of a description of a concrete situation based on one of the five objectives, followed by a question asking for an open ended statement of the respondent's position regarding the statement. The questions were to be asked in interview, the answers recorded on tape, and finally coded for a positive, intermediate of negative position on a three-point scale.

To this end an original pool of about 40 items was prepared and tried out in small scale interviews with groups of two to three high school or teachers' college students at a time. This trial revealed limitations in the open-ended format, and the item pool was then recast into a three alternative, multiple choice format, with one alternative representing a negative position, one a positive position, and one intermediate position, the respondents being asked to choose which of the three alternatives was closest to their own ideas.

> The following is an example of an item developed for Objective 4. Some people bought some land on the side of a hill where there was a big cave. The people who lived nearby told them they believed gardens should not be put on the hill because the cave would make the gardens die.

What do you think they should do?

(a) Go away and never use the land.

(b) Try gardening on the land to see whether the gardens would grow.

(c) Ask other people nearby what they thought the cave might do to the gardens.

The items were cast into three forms—Form A of 36 items, Form B of 32 items, and Form C consisting of 23 items which were common to both Form A and Form B. These three forms were given a large scale preliminary trial with teachers' college and high school students in a group interview situation, where the questions were read in English to the group, and the respondents marked their response on an answer sheet.

Analysis of this trial showed that the items were discriminating well between individual respondents, and open-ended discussion after the instrument administration revealed that the students were strongly of the opinion that uneducated villagers would select the negative responses.

The three forms were then translated into Pidgin, and a major field trial conducted on a sample of fourth year high school students and illiterate plantation and town labourers. The students were interviewed in English and the labourers in Pidgin, the interviews being conducted in face to face situations.

The final form was translated into Raiapo Enga and Hiri Motu versions, to be used with the English and Pidgin forms in a major research trial.

RESULTS OF ANALYSES OF THE PRELIMINARY TRIALS

As the instrument was to be used in major comparative research, the aim was to develop a unitary scale of high reliability. In the first large group trial with Teachers' College and high school students, coefficient alphas were obtained of 0.61 on Form A, 0.79 on Form B, and 0.60 on Form C. These values were considered very encouraging, as the sample represented a restricted, top of the range sample, lacking illiterate villagers. The Form C consisted only of 23 items, expected to be about the same number as the finalized form.

In the major preliminary trial, the prediction borne out by the group trial was realized, with a coefficient alpha of 0.92 for Form A, 0.90 for Form B, and 0.88 for Form C. An inter-interviewer correlation of 0.95, significant at the 0.01 level, was obtained between scores obtained on half interviews conducted by one interviewer and the other half conducted by a second interviewer, indicating little error due to different interviewers.

From the items in Form A and Form B, 26 items were selected on the basis of the highest correlation between the item score and the total score, using Form C as a moderator on the common items.

The wording of the final items and the Pidgin translation were improved on the basis of the experienced gained during the trials, and then both versions were given to translators to produce a Hiri Motu and a Raiapo Enga version.

THE MAIN FIELD TRIAL—A COMPARATIVE STUDY

Technique of Interview

The next stage was to conduct a major comparative study on a broad spectrum sample, to give the attitude scale a major field test under the research conditions for which it was designed. One hundred and ten subjects were interviewed twice, about six weeks apart, under face to face conditions, using interpreters where the Papua New Guinea language versions were administered. Each story forming the item stem was read aloud twice, and the respondent asked to select which alternative was closest to the way he or she would think or act in the same circumstances. The answers were recorded on tape, and at the same time coded on to a data sheet. Each item was followed by open-ended discussion which was also recorded on tape. The students were also asked to predict what answers they thought their village counterparts would give. The time taken for the interviews turned out to be approximately the same as in the Kluckhohn and Strodtbeck (1961) study, ranging from about 1½ hours to two hours in length.

The Sample and Conditions of Interview

Most research in Papua New Guinea has been of the focussed type, concentrating on a small section of the population, usually a single ethnic group or single class of educated Papua New Guineans. Although focussed studies provide valuable research information, broad studies are also needed. As Mead (1968) points out, much of the anthropological material available is too particular to be of much help, with its mass of detail on kinship patterns and related behaviours. The comparative study using the "Environmental Phenomena Attitude Scale" was deliberately aimed at a wide representative sample to obtain more generalizable results of value to the educator.

The multiplicity of languages and the interview format employing interpreters with illiterate subjects, inherent communication and geographical difficulties, the high cost from personal funds and the need to complete two administrations between May and October to avoid conflict with final examinations in the schools, imposed restrictions on the size of the sample.

Schools were selected because they had enough Form 3 and Form 4 students speaking a single language who could be matched for comparison purposes by an equivalent group of about the same age, speaking the same language, but with three years of primary or four years of vernacular literacy schooling or less. Subjects were selected from the Western Highlands and Chimbu Districts, representing the highland dimension, and from Madang, Central and Gulf Districts representing the coastal dimension. The sample structure by subject's language and degree of formal education is given in Table 1.

English or Pidgin was used for interviewing the high school students, while their villager counterparts were interviewed in Pidgin, Hiri Motu or Enga, as appropriate to the region.

TABLE 1. *Sample Structure, Face to Face Interviews, Years of Schooling and Language of Interview*

	Years, Formal Schooling	*Language of Interview*				
		Engl.	*Pidgin*	*Hiri Motu*	*Enga*	*Total*
High School	10	47	10	0	0	57
Students	9	2	3	0	0	5
	4 (Vernacular)	0	2	0	0	2
Minimally	2-3 (Primary)	0	10	5	2	17
Educated	1-2 (Primary)	0	7	1	2	10
Subjects	Nil	0	5	2	12	19
	Total	49	37	8	16	110

Subjects were defined as urban if their school or place of abode and work was in a recognized town or city, and rural if it was far enough away from a town or city to make easy and regular access difficult and infrequent.

Random selection was used wherever possible but the subject pool was often only just large enough to provide the number of subjects required. It was also aimed to keep the cells of the design as close to equal as possible, but this also proved an impossibility because of the difficulties encountered.

A team of interviewers and interpreters was needed to cope with the sample, with different interviewers having to be used in the different regions, with the researcher acting as a common factor throughout. Training of interviewers in the standard procedures to be adopted was done using tapes from the preliminary trial interviews, practice sessions of dummy interviews, and wherever possible having the interviewer observe at least one actual interview in progress. In most cases where interpreters were used, an assistant was also present who spoke the language and acted as a check interpreter.

A number of difficulties were encountered in obtaining minimally educated subjects for the sample. Many people who were approached were not willing to be interviewed, particularly when names were asked for. Names were needed to identify subjects for the retest interviews. In Port Moresby, friction between high school students and their counterparts who had dropped out of school created difficulties in establishing contact and persuading minimally educated subjects to be interviewed. In Kerema and Huia, the drift of young people who had left early in their primary school years to Port Moresby reduced the number of available subjects.

Conditions of interviewing for the students were maintained fairly uniformly, with vacant classrooms or offices being made available, but it was not always possible to control conditions for the village interviews, situations allowing for maximum rapport being aimed at. Where interviews were conducted in the open, friends and passers-by were almost invariably present, and attempts to prevent their being present usually resulted in a turmoil which was more disturbing to the interviewee. Girls provided a major difficulty in their reluctance to be interviewed, and their soft-voiced responses were difficult to hear and record.

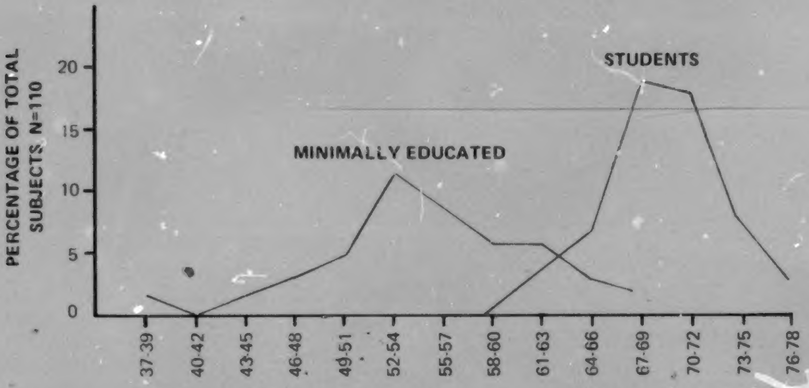
Processing of Data

Coded computer answer sheets were processed by an IBM 1230 machine, and a CDC 6600 computer at Florida State University, using programmes prepared for and written by the researcher.

Results of Instrument Analyses

In the first round of interviews, the distribution pattern illustrated in Figure 1 was obtained and the coefficient alpha obtained was 0.84. The retest round alpha was 0.89. These reliability coefficients were high enough to give confidence in comparisons between means.

FIGURE 1. *Distribution of scores for students and minimally educated subjects in the first round of face to face interviews.*



A split-half reliability analysis carried out on a sub-sample of 13 subjects where one half of the interview was conducted by the researcher and the other half by a second interviewer, gave a split-half reliability of 0.80 (Nunnally, 1967, p. 194). This value reinforced the preliminary round conclusion that error due to different interviewers had little effect.

Retest reliability, obtained by correlating the second round scores with the first round scores was 0.77, significant at 0.01. However there was a small, statistically significant increase in mean between the first and retest administrations, probably attributable to a retest effect. The six weeks between administrations was much shorter than the six months or more recommended by Nunnally (1967) for retest reliability trials.

Results of Comparative Studies

The comparative study embodied in the main trial sought to seek information about the attitudes held, as measured by the Environmental Phenomena Attitude Scale, by students and their minimally educated counterparts. The results of this comparison provide evidence for the construct validity of the instrument. As defined by Cronbach (1971), a construct is a deliberate creation chosen to organize experience into general, lawlike statements. Construct validity cannot be established in a single study, but in this study a result compatible with the model from which the construct was derived provides the first piece of evidence in support.

The construct "attitude towards investigation, control and manipulation of natural phenomena" was postulated. The cumulative evidence from the research of anthropologists suggests that if the formal school system is in any way succeeding in its objectives the scores of villagers who lack formal schooling should be much lower on the scale than those of high school students.

It is not being suggested that any difference between the two groups can be attributed to science teaching alone, but it is assumed that because of the special nature of science and its demands on students, that studying science would have made a significant contribution to such a difference.

In a 2 × 2 × 2 analysis of variance design used to test education, regional and life-style effects, the results obtained gave a major significant difference between the student and villager means, but no significant differences for the urban-rural or the highland-coastal effects. The results are summarized in Table 2 for the following null hypotheses:

1. Educational Effect (E)
   Ho: there is no difference between the mean scores on the Environmental Phenomena Attitude Scale gained by the sample of high school students and by the minimally educated subjects;
2. Regional Effect (R)
   Ho: there is no difference between the mean scores on the Environmental Phenomena Attitude Scale gained by the coastal subjects and the highland subjects;
3. Urban-Rural Effect (H)
   Ho: there is no difference between the mean scores on the Environmental Phenomena Attitude Scale gained by the urban subjects and the rural subjects.

Hypotheses on the interactions were not investigated as they were not considered meaningful to this study.

The analysis model was as follows:

$$y = M + R + E + S + RE + SE + RS + ERS + ERROR$$

TABLE 2. *Face to Face Interviews Analysis of Variance*

N	*Means*			
110	Students	69.2	Min. Educated	55.6
	Coastal	63.9	Highland	62.9
	Urban	62.2	Rural	64.4
			Grand	63.3

		Coastal (R1)		*Highland (R2)*	
		Urban (H1)	*Rural (H2)*	*Urban (H1)*	*Rural (H2)*
Students (E1)	Cell Sample Size	17	13	13	19
	Mean	68.6	69.2	70.2	69.2
	Standard Deviation	4.9	2.4	2.7	4.6
Minimally Educated (E2)	Cell Sample Size	12	4	15	17
	Mean	54.3	56.3	54.5	57.5
	Standard Deviation	4.7	3.9	7.9	6.0

Variable	*Sum Sq.*	*df F*	*Crit. F*	*P*	*F*	*E*	E^2
R	6.79	1/102		—	0.27	0.00	0.00
E	3945.11	1/102	11.76	0.001	157.71	0.78	0.61
H	26.98	1/102		—	1.08	0.00	0.00
RE	0.01						
HE	42.65						
HR	0.00						
EHR	12.85						
Error	2551.50						

The difference between the student and minimally educated mean of 13.6 gave an F ratio of 157.71, and an epsilon (E) of 0.78 (Cohen, 1965, p. 105). Epsilon is a statistic providing a universal measure of relationship, used with analysis of variance designs, where degrees of freedom, instead of numbers of subjects are used to calculate sources of variance (Nunnally, 1967, p. 136).

The high epsilon shows a very strong relationship between scores obtained on the scale and membership of the student or villager group, which shows up very well in the bimodal distribution illustrated in Figure 1.

Figure 2 gives plots of means for the three main effects. The major significant difference between student and villagers is clearly shown in the top pair, as are the small non-significant differences for the other effects in the lower two plots.

Male-female effect was also investigated by recasting the analysis of variance design, but only a small, non-significant difference was found between the means of the scores for males and females.

The strong education effect is in the direction predicted from the model used to develop the construct, and is therefore considered supportive evidence for construct validity.

FIGURE 2. *Plot of means given in Table 7 for analysis of variance in Model 2: Education, Regional and Urban-Rural Effects.*

The Predictions

The predictions made by students as to the answers expected of their minimally educated village counterparts were also analyzed and compared with their own scores, and scores actually obtained by the villager sample, using †-tests.

The two null hypotheses tested were:

1. Ho: there is no difference between the mean of scores predicted by the students for minimally educated subjects and the mean of scores actually obtained by them.
2. Ho: there is no difference between the mean of scores obtained by the students on the Environmental Phenomena Attitude Scale and the mean of the scores predicted by the students for uneducated people.

The first hypothesis was tested by a †-test appropriate for the difference between two means with different variances (Yamane, 1964) and a †-ratio of 18-78, signfiicant at the 0.001 level, obtained. A Pearson product moment correlation between the student scores and their predictions of —0.26, significant at the 0.05 level, was obtained. These results are summarized in Table 3 and Figure 4.

The significant negative correlation indicates that there was a distinct tendency for students scoring high on the scale to predict scores lower on the range than predictions made by students scoring lower. The open-ended follow-up discussion revealed that the students in general held a very patronizing view of the attitudes held by their village counterparts and attributed the difference to villager ignorance through not having been to school and not having studied science.

TABLE 3. *Comparison of Student Predictions with Own Scores*

Student Scores	Number in Sample	59		
	Mean	69.2	r	—0.26
	Standard Deviation	3.9	P	<0.05
Predictions	Number in Sample	59		
	Mean	47.6	r^2	0.07
	Standard Deviation	8.0		

†—Ratio 18.78, Degrees of Freedom (‡) 85, Critical † 3.43, $P<0.001$

FIGURE 3. *Plot of means of actual scores obtained by students and the means of predictions, coastal and highland students.*

TABLE 4. *Comparison of Predictions with Scores of Minimally Educated Subjects.*

Minimally Educated	Number in Sample	48		
	Mean	55.6	rpb	0.51
	Standard Deviation	6.0	P	<0.01
Predictions	Number in Sample	59		
	Mean	47.6	rpb^2	0.26
	Standard Deviation	8.0		

†—Ration 5.88, Degrees of Freedom (‡) 129, Critical † 3.29, $P<0.001$

FIGURE 4. *Plot of means of actual scores obtained by minimally educated subjects and means of predictions made by students, coastal and highland.*

The †-ratio obtained for the second case was 5.88, with calculated degrees of freedom 129 (Yamane, 1964), significant at the 0.001 level, and the null hypothesis was rejected. The point biserial correlation obtained from the †-ratio (Cohen, 1965, p. 104) was 0.51, indicating about 26 per cent of the variance being associated with sample membership and the scores. The results are summarized in Table 4 and Figure 4. This difference is not nearly so strong as the gap predicted by the students.

CONCLUSIONS

The pilot study shows that it is possible to develop an instrument which will produce scores at a high level of reliability in a cross-cultural, multilingual broad-spectrum sample situation in Papua New Guinea. The results are consistent with the rationale for developing the instrument and indicate that a strong difference in attitude towards investigation, control and manipulation of natural phenomena, as measured by the environmental attitude scale, occurs between 3rd and 4th year high schools and their counterparts of about the same age, speaking the same language, but with minimal formal schooling.

This difference is pervasive and uniform across regional boundaries and in towns and rural centres, and in both sexes, there being no significant differences in the highland-coastal, urban-rural or male-female dimensions.

Open-ended discussion indicates that science teaching in the schools is having an important effect on the differences in attitudes between the products of formal schooling and those with little or no schooling. In fact it appears that there has been a sound degree of success in achieving the affective-domain aims of the science syllabus.

Students patronisingly see themselves as a race apart from their village counterpart and attribute this difference to schooling, although the actual difference does not appear to be as great as predicted by the students.

The question raised by any attitude study is to what degree the answers really reflect the true feelings of the respondents, rather than a perception of what they think the researcher wants. Every precaution was taken in this study, in the way the items were framed, in the administration and the open-ended discussion to detect any such deliberate attempt, and no evidence of any such efforts were detected. If it does exist it must do so on a massive scale, because of the consistency of the results.

The instrument nevertheless has obtained only verbal response, and whether a person's actual course of action, when really faced with a situation, would be the same as his stated intentions, is another issue. However, verbalized statement of attitude has some value, and if pervasive, can have important effects on courses of action.

Concern has often been expressed at the gap that formal schooling in developing countries creates between the elite product of the schools and the people left behind in the villages. There is a current campaign in Papua New Guinea's schools to promote interest in local culture and programmes of "community living", in an attempt to relate education to the needs of the country.

This study provides one measure that indicates that in effect the gap is a strong and real one in the area of attitude to the environment. This could lead to tension, and calls for a major rethinking about schools, their curricula, and their functions in Papua New Guinea society.

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A RELEVANT TECHNICAL EDUCATION

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"As the man made sectors of human environments grow in importance, technology, rather than being merely an activity of man, partakes more and more of the nature of man".[1]

It would be wrong to accept that the criteria for assessing social and technological well-being in a western country should be used in Papua New Guinea. This is the basis of our problem in trying to assess what the future here might be. We have imposed a system of existence (we know it as commercialism — committed to economic growth) on the population of this country for which they did not elect. Indeed in our eyes no election, no alternative, exists. This is the way.

The Australian Administration has endeavoured to impose here a system of government, commercial management, social welfare and technology which in fact is quite foreign to indigenous culture. We have a police force, a chamber of commerce, an electricity authority, a returned services club and even an apprenticeship board, just like we have back home.

I do not mean to be flippant and this is not to denigrate or belittle the efforts of those administrators and educators who have worked so hard for progress here. What could we do but what we knew, and what could we teach but what we knew to be "*better*" and what we "*knew*" would work. The achievements in changing social organization and education in this country, in the last few years at least, have been mammoth in relation to expenditure. My point is that we should not now be surprised that the sort of feedback and statistics we are receiving as to the success of our operations are not in keeping with what we expect in the Australian or Western model.

Now that Papua New Guinea has the opportunity, and a measure of background, to identify itself and to see what its needs are, then perhaps we will see a breakaway from some of the forms of organisation which now exist.

The country is committed to change and that change is running in the direction of Western materialism. Our dilemma is how much change in this direction is likely to occur and how quickly is it likely to take place. Do we face an increase in economic activity or do we face a levelling off; or even a regression?

We should all be aware that growth and progress in the generally accepted sense are very closely linked to economic planning and political expediency. The demand for skilled manpower and thus the training of such manpower must be based on predictions, and predicting at this time is a hazardous game. It remains a fact however that high level and skilled manpower, technical education must be geared to the future needs of the economy and the overall capacity of the government to support it.

"A simple systems approach to training and economic development has been outlined in figure 1 which illustrates manpower production based on co-operation and good communication between education, training (A), industry (B), Government ministeries (D), professional institutions and trade unions (C). Manpower when produced by this process is of no use unless effectively used by sound management (E) with development plans (F) to produce overall national economic development (G).[2]

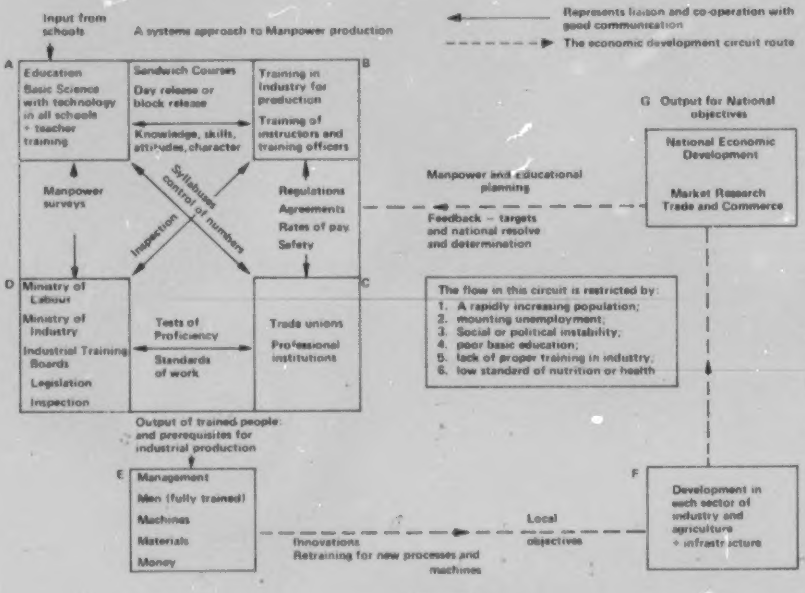
Input from schools
A systems approach to Manpower production
Represents liaison and co-operation with good communication
The economic development circuit route
A
Education
Basic Science with technology in all schools + teacher training
Sandwich Courses
Day release or block release
Knowledge, skills, attitudes, character
B
Training in industry for production
Training of instructors and training officers
G Output for National objectives
National Economic Development
Market Research Trade and Commerce
Manpower surveys
Syllabuses control of numbers
Inspection
Regulations
Agreements
Rates of pay
Safety
Manpower and educational planning
Feedback – targets and national resolve and determination
D
Ministry of Labour
Ministry of Industry
Industrial Training Boards
Legislation
Inspection
Tests of Proficiency
Standards of work
C
Trade unions
Professional institutions
The flow in this circuit is restricted by:
1. A rapidly increasing population;
2. mounting unemployment;
3. Social or political instability;
4. poor basic education;
5. lack of proper training in industry;
6. low standard of nutrition or health
Output of trained people and prerequisites for industrial production
E
Management
Men (fully trained)
Machines
Materials
Money
Innovations
Retraining for new processes and machines
Local objectives
F
Development in each sector of industry and agriculture + infrastructure

FIGURE 1

To complete the system there must be feedback from (G) to (A), (B), (C) and (D) so that training at all levels is suited to, and controlled by, the needs, either local or national.

The feedback will help to ensure that education and training programmes prepare for the rapidly changing job market and give them the necessary skills, knowledge and attitudes to profit from further on-the-job training.

This is particularly important in the developing countries where it has been found that only about 50 per cent of the people with a vocational education actually fill jobs for which they were prepared.*

What is so often lacking, particularly in the developing countries, is effective communication and co-operation between the groups (A), (B), (C) and (D) in the diagram. Each one should be in close liaison with the other three.

In the developing countries (A) if often given undue financial support and priority in the mistaken belief that technical education by itself can produce trained manpower, and will automatically increase the industrial development and productivity of a nation — *a condition for industrial development is mistaken as a cause of it.* Technical education is a *necessary,* but not a *sufficient,* factor in the system. Manpower is produced by co-operation between (A), (B), (C) and (D), but the output must go through the process denoted by (E), (F) and (G)".

I would like to suggest that our needs in the field of technical education for Papua New Guinea be looked at in three separate areas;

(a) the tertiary or professional area of the engineer, architect, surveyor and accountant

(b) the skilled manpower area of the tradesman

(c) the general public including the newly educated primary and secondary leavers, the village dweller and the urban squatter.

Democratically, I should deal with the general public first and it is my opinion that this is the most important area, in the absolute sense, however education in developing countries sometimes has to reverse the seemingly natural order of things in order to fit in with the pressing needs of time and economy.

Technical education at all levels is the most expensive of the education categories. It requires highly capitalised equipment and facilities, specialist staff and, residually, the geographic centralisation of such facilities and staff leading to increased expenditure on accommodation and travel. These factors seem to have been foremost in determining the situation existent in most developing countries, that, technical education is the cinderella and usually remains so almost to the end.

*This figure was just below 50% for P.N.G. in 1972 and 1973.

Tertiary Level Technical Education

I believe it would be erroneous to presume that expansion in mining, exploration and survey operations will significantly increase the need for higher technical education across the board. It would be a safer speculation to predict a general levelling of all kinds of economic activity or at least a slowing down of the rate of growth; and this to be discernible within the next few years.

The need for high level technical education was recognised with the opening of the Institute of Technology, now the University of Technology, in Lae. Courses there are in the fields of Engineering, Architecture, Survey and Commerce. Courses are at full professional and subprofessional levels.

It should be noted that tertiary level education is carried out in Agriculture at the Vudal Agricultural College, New Britain and forestry studies at the Forestry School at Bulolo. It seems that moves to rationalise the facilities of these institutions has been hindered by the facts of history, (they were established at different times) geography, and the very divergence of the studies undertaken.

This rationalisation of facilities for these institutions is no doubt being considered by the office of Higher Education. It is doubtful that a country of the size of P.N.G. at this time of its development can afford two separate universities (one on a dual campus now that Goroka Teachers College is to be part of U.P.N.G.) let alone a separate Agricultural and a separate Forestry institute.

It is difficult to predict when these institutions will begin to cater for the existing need for high level technologist but it is well to be aware of the dangers of overproducing. I am predicting and speculating as to economic and industrial growth but it seems there will be places for many years. Producing graduates is one thing — it's a start — but, as even the developed countries have come to realise, there is no substitute for the real thing of the work situation and only the years will produce the experienced, confident technologists to make the nation truly independent.

The need for the preservation of national heritage and cultural identity has not escaped attention at the University of Papua New Guinea and this has been supported by the establishment of a Centre for Creative Arts, at the University. The Creative Arts Centre seems primarily concerned with traditional or primitive art and with the preservation of historic cultural material. The attempt to push young artists, already subjected to schooling and other westernizing influences into reproducing traditional images has resulted in Art in P.N.G. becoming something of a freak show. The centre seems lesser concerned with the broader development of Art and Design for contemporary Papua New Guinea; and here I refer particularly to the fields of environmental, industrial and interior design.*

With the emerging new life style, the proliferation of machinery and gadgetry, the flood of information and the accelerated rate of technological change, planned environmental design should not be left to the hopeful good intent of commercial interests or the unco-ordinated efforts of architects and accountants. A separate study in this field should be established as soon as possible and the University of Technology seems the best venue. This of course will need to be supported by job opportunities for graduates in a Ministry for the Environment or similar body — and legislative backing.

Skilled Manpower — Tradesman, Technical Education

"The literate person has learned how to learn and this ability is transferred to other skills; he is familiar with various modes of communication and has acquired his literacy through the use of several cognitive and motor skills such as reading and writing."[3]

I

Given the above and the fact that most students enter secondary school just that little too physically immature for heavy manual work the Department of Education has since 1968 operated a system known as the "Two-two System". The first two years at secondary schools are designed as a unit aimed at fitting those who terminate their studies at this stage for low or medium level occupations in the urban structure. Of those who qualify for two further years of education and *the School Certificate* about twenty percent are offered the opportunity of transferring to Technical Schools or

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*I have been alarmed to learn that the National Cultural Council of P.N.G. has as its members officers of the Creative Arts Centre of U.P.N.G. and that the Centre is a major beneficiary of the Council.(!)

Colleges where they can attain their School Certificate with accreditation in the core academic subjects of English, Maths and Science and Social Science with two units of either Building or Mechanical Trades Technology.

One of the practical drawbacks to the scheme, from an operational point of view, was that traditionally minded headmasters of secondary schools jealously retained their better students and used the Technical Schools as a bogey for those slacking in their studies and as a dump for the educational non-conformists or disciplinary problems. My most unpleasant memories as a headmaster of a Technical School are associated with "remittance men" from high schools.

Credits used to be given toward trade certification by way of a year off the apprenticeship indentureship and this did attract a larger number of better students to the technical institutions because the students saw that they were increasing their range of options.

When a certain amount of employment scarcity came about 1971-72 and employers could afford to be more choosey it became obvious that the larger enterprises preferred to take their apprentices from the high schools. They could keep them indentured for a longer period (cheaper labour) and train them their own way for their own specific needs. In 1972, 40% of all apprentices indentured were from secondary schools.

The credits were subsequently dropped and on the limited figures available for 1973 graduates, indications are that whilst the percentage has marginally increased there remains a large percentage of graduates from technical institutions who have to find work in other fields and a high percentage of high school graduates going into trades.

Included in the information gathered to support this paper was a reply from Kennecott Pacific a subsidiary of the giant international mining exploration enterprise.*

"The popular myth that technical and commercial skills can be acquired with a minimum of brainpower is obviously still perpetuated in the academic minds of some High School Teachers and others not only here but the world over.

Until the entire concept of running technical and commercial training parallel to four normal high school curriculum subjects (i.e. English, Maths, Science and usually Social Studies) is scrapped then it is evident that either the academic or the technical/commercial subjects will suffer. Since it is imperative that the goal of the School Certificate be achieved, it is therefore usually the technical, commercial training that is skimped on to the detriment of the would be tradesman."

Late in 1973 the Committee of Technical Education (a sub-committee of the National Education Board) wrote to the Governing bodies of technical institutions requesting suggestions about possible changes to syllabuses and administration arrangements for courses. The following is a passage of the submission I made on behalf of Goroka Technical School's Board of Governors at that time.

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*I am grateful to M. Grahame Bowden, of Goroka Technical College; the figures and basic information he has gathered have been the basis of much of this paper.

"Because we at Goroka Tech. are primarily concerned with Continuous Training, I will concentrate most of my comments on that area. However before doing so let me point out that we see it that the basic premise for this type of training is the assumption that a great proportion of the graduates will find their way into trade level, technological occupations. This has been, and, it seems, will continue to be pre-vocational type training with progression through the apprenticeship system to trade certification. This premise seems to be based on an even earlier concept that the apprenticeship training of the old European variety is still the best way of producing the kind of technologists required by Papua New Guinea. It seems those of us engaged with continuous training programmes are endeavouring to produce graduates suitable for indenturing into trade occupations in Australia because we have imposed an Australian mode apprenticeship system on this economy.

I personally believe that this system is wrong for P.N.G. in that it is far too inflexible, especially in that it commits young men to one trade area, with one employer for a period of up to four or five years at a time of life when these young men are incapable of making adequate choices about their future.

Indigenous employers have already shown a reluctance to take on apprentices under the current system. A module system of trade competence accreditation based on work experience and assessment by some authoritative body (such as the Apprenticeship Board) would be much more viable here. Such a system could certificate tradesmen in four, five or fifty years and need not align itself with any foreign and confusing categorizing of trades from other places, e.g. fitter/welder; plumber/welder; steel fabricator/welder; sheetmetal worker?*

It would seem however that whatever the 'after school' training will be, the role of the schools and colleges will be tied directly to it. I dispute that this is a wholly good thing. Employers have been quick to show us that they prefer to do their own specialist training (e.g. their preference for High School graduates whom they could keep for an extra year under the old credits system). Maybe we should be going back to teaching a more basic technology based on problem solving with materials and containing elements of applied physics, applied maths, trade communication and commerce with a heavy emphasis on the need for on the job project experience and the inculcation of good work attitudes and habits.

Whatever form our pre-vocational education takes one thing is for certain and that it that it must be a *job choice decision* and more particularly a *post secondary school decision*. The situation at present with our highly capitalised technical institutions competing with High schools is economically bad and wasteful of resources both human and material.

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*I believe there were only two persons apprenticed to indigenous employers in 1972.

With the withdrawal of our Technical Schools and Colleges from the *'School Certificate Stakes'* these institutions could be given a wider and more flexible brief: they could become centres of technological innovation in their regions and offer a broader service to the community as well as be a source of basically trained, work oriented personnel for technical occupations. I believe it is high time that we in Technical Education started setting the pace and stopped relying on private industry and commercial employers to tell us what to do and how to do it. For what I have in mind there may be a need for a deal of liaison and co-operation with the Department of Business Development (nee Trade and Industry) but at the moment I doubt that Department's capacity to do much more than send itself impotent memos and transfer accountants from one centre to another.

I am suggesting that our Technical Institutions become large scale or giant vocational centres with entry at post secondary level (not all trades need a Form IV) professionally staffed and properly financed.

The point could be made that we could miss this pre-vocational step altogether and use the schools/colleges for block courses — in service training, only. But we are already catering for this work and continuous training as well — thus many of our facilities would be wasted. I believe that in order to make optimum use of our facilities and the nation's resources we should be re-orienting our schools and colleges to the type of operation outlined above.

I realise that what I have suggested is broad in concept and is not immediately possible; it ignores many details and logistic considerations but I sincerely believe that this is the way we should be going and the sooner we correct course the better.

The P.E.T.T. courses outlined in Td 24/73 seem to be a step in the right direction."

(P.E.T.T. — Pre- Employment Technical Training — 6 to 12 months intensive pre-employment training — post Form 4.)

II

It is gratifying to learn that the currently proposed five year plan for the Education Department includes provision for prevocational technical education to be post secondary and that the proposals for syllabuses are wider and more flexible. Current technical education syllabuses at Form 3 and Form 4 level seem to ignore the Eight Point Plan and the need for a home grown product.

It is also interesting to note in the five year plan provision for the possibility of establishing something of the nature of a National Service programme for High School graduates to carry out community work and that participation in such work would be a pre-requisite to further study beyond the Form 4 hurdle.

Technical Colleges would seem to be the obvious strategic locations for these forces for communal good. (The accommodation facilities released by the non pursuit of the School Certificate could be used.) The Colleges are already equipped with highly valuable equipment and trained trade staff. However the equipment items they include would have to come out of the showpiece demonstration role they now occupy and become working, earning assets at well. Many existing technical college instructors would need to throw away their dust coats and lectures and roll up their sleeves again; they would need to adopt a more flexible role in line with the Eight Point Plan's requirements.

(I have tried to have built in Goroka an assembly/recreation hall designed with indigenous materials but the European trades staff would not touch it, using the excuse that the work is not in the syllabus! Also the submission went four times to the local Building Board before they relaxed their insistence on a steel frame.)

I see that the National Service scheme could be the basis of a scheme to re-orient the thinking of tertiary students back towards the needs of the people through grass roots contact at the rural/pedestrian level. But it needs to be a big thing, well organised and well run. Any half hearted efforts such as running it entirely through District Co-ordinating Committees, as has been suggested, will risk disaster and a reverse effect to what is intended.

I feel that if, as the proposal projects, entry to the National Service is for Form 4 graduates only then the dangers of the use of the Service as some sort of political tool to appease the unemployed should be minimised. If the Service gets off the ground then there will be pressure in this regard and such a move should be watched very carefully. There are ample examples in the African scene — notably the scandal of the Workers Brigade of Kwane Nkrumah in Ghana, pointing to the dangers of such schemes.

The General Public

Objects in a primitive environment are personalised and tied to the whole of man's existence by religion and ritual as well as possession and use. Ownership, purpose, function, form and decoration are all one. The proliferation of mass produced goods of foreign material for foreign uses has disrupted the traditional man-object relationship in Papua New Guinea. The imposition of the commercial system and its associated materialist philosophy and attendant technology have further contributed to this alienation of the people from their surroundings.

Education in the technology of modern living has been virtually non existent yet foreigners are always incensed or amused at any incongruous use of foreign materials or objects. What should we expect given the facts?

The teaching of academic subjects, English, Maths, Science, Social Science or History has always taken precedence in our schools in the expectancy that a better way of life would somehow, magically follow. Most graduates from secondary schools find themselves projected into clerical type occupations and never acquire the understanding of material technology which is basic to modern living. There will be many Westerners who read this and who claim a similar level of naivety in this regard, but they deny themselves credit for the years they spent with mechano sets, tricycles, dad's hammer and mum's egg beater.

My contention is that whilst we do have some manpower training we have little or no technical education. And this is because our education administrators have never really recognised that education in basic technology should be a fundamental component of general education.

There seems to be little we can do at this stage for the pre-school age child or for those in primary education although I would like to be able to look at this area more thoroughly. I recognise that the Department has taken steps to ensure village participation in school construction and that the primary science courses are a step in reducing the gap — but is this enough? I am sure we could do more in secondary schools both by increasing the status of technological studies and giving the subject more time. This should not result in a cost any greater than of the present, as existing Manual Arts and Home Economics courses should be modified away from the Australian model towards a more meaningful locally based study. I have been advocating a general crafts room for secondary schools here since 1963 but we persist with replicas of the Australian woodwork and metalwork classrooms.*

The idea of base level community technical schools or centres was conceived about 1962 and a number (about 25) were established. They were a one or two man institution, usually with an expatriate tradesman in charge, teaching basic building, plumbing and mechanical skills together with agriculture to village people. The idea has caught on and we now have a large number (about 70) of what we now call Vocational Centres. The new name changes the emphasis away from the general concept of a sit down, book institution to one which aims at direct economic or product return training.

Entrants to Vocational Centres must be post Standard Six and over fifteen years old.

Whether these institutions are generally worthwhile is very difficult to assess, as whilst I am sure the Department could furnish evidence of genuine success stories, for particular cases, I question the return as compared to capital outlay in the way of facilities and overseas staffing salaries. National planning figures indicate that because of higher priorities localizing of staffing in this area will not commence in terms of real numbers until about 1978. Other inhibiting factors with regard to these vocational centres are, that in the urban situation, like the forms of formal technical education, they are dependent on general economic trends, while in the rural situation the complicated and involved system of land tenure makes it almost impossible to select applicants on the basis of their prospects for success. Coming from a society where everyone has the right and ostensively the privilege, of making good, we presume the same here, whereas many young Papua New Guineans are born on the wrong side of the tracks, as is were, with no rights to land or village stature; their only chance is to make it to, and in, the academic school — and leave home.

These vocational centres cater for a small proportion of the country's population and I feel greater attention should be paid to the great majority of villagers to whom technical attention is a by-product of imposed development, — a haphazard, catch-as-catch-can process of observing, copying, modifying, innovating and making do.

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*The course for Secondary Teachers in this subject at Goroka has been re-named Design & Technology and has more realistic goals.

First attempts at change from the known are usually a shortfall — but there seems no way from the ethnic unspoilt beauty of the native village to modern suburbia (if that is a desired goal) save but through the government's low cost housing development and the subsequent shanty town.

The dilemma of what to do for the villager is no less urgent in the technology and technical education field than it is in the general education field. We just cannot afford the type of facilities and staff or the time required, but as an educationalist, I belive we could at least take heed of what I have always regarded as the foundation of all good teaching, which is to set a good example.

Technology in Papua New Guinea has always been geared to the Australian Government's capacity to provide rather than the indigenous capacity to digest. Imported steel trusses take precedence over poles because of our impatience with village land rites; foreign, imported asbestos sheeting is preferred in boys dormitories to pit pit matting, or even locally produced plywood because of contract, competitive tendering; a local ceramic brick industry virtually went broke through lack of government support! In 1969-1970 53% of new motor vehicles registered in the Chimbu District did not make it back to the registration office.

There are other examples of bad design and misused opportunities for development through natural assets. The glass, throw away bottle in a bare foot country must place the government in line for prosecution for neglect whilst the vast labour potential of the highlands villagers lies waiting for the exploitation of the rich ceramic raw material at their feet.

Little genuine attempt has been made at a marriage of materials and methods to involve a greater level of indigenous participation but this has been partially due to the attitudes of the local people who, encouraged by the schools system, have adopted a passive role in the relationship and taken a "what do I do, how do I do it attitude". (There is good ammunition here for Illitch and Reimer in their postulation that schools are diseducative.)

It is time we stopped subscribing to the convenient social virtue that only what is good for business is good for everyone. The time is ripe for strong legislative directions in these matters and it is pleasing to note the measures already adopted with regard to packaging and trading in this regard.

At this point the emerging countries should stop to look at the one-third of the world which has so far become industrialised. They may well ask: "Is it worth it?" With the expanding development of machinery we have seen the limiting of the individual sphere of action; with each development comes less pride of achievement and more sense of frustration. This was summed up by Professor R. H. Tawney, as long as fifty years ago: 'The burden of our civilization is not merely, as many suppose, that the product of industry

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*I recognise Public Works Building Research Section as having done research in this regard.

is ill-distributed, or its conduct tyrannical, or its operation interrupted by bitter disagreements. It is that industry itself has come to hold a position of exclusive predominance among human interests, which no single interest, and least of all the provision of the material means of existence, is fit to occupy. Like a hypochondriac who is so absorbed in the process of his own digestion that he goes to the grave before he has begun to live, industrialised communities neglect the very objects for which it is worthwhile to acquire riches in their feverish preoccupation with the means by which riches can be acquired'."

Indeed we may well ask "Is it worth it?" but I think the answer is "Yes, if we proceed with caution".

"There are a thousand opportunities to gain from the wisdom of the white man, yet there is no need to make the ten thousand mistakes of the white man."[5]

I do not want to be another prophet of doom; the worst, I hope, is over. Much has been achieved and the plumbing to the Council House in Henganofi or the Papuan Club in Moresby is repaired today by indigenous plumbers — some are even members.

Much credit is due to the teachers, instructors and educational administrators who have worked so hard here, especially the men and women of the Technical Division of the Department of Education, who have responded to the government's and private industry's call for courses in a great diversity of technical skills, often against great difficulties. Even greater credit must go to the young men and women of Papua New Guinea who have made such giant strides in such short a time.

Papua New Guinea is on the threshold of nationhood. It has been given a start in the mode of western technology and I hope a warning about its effects. Where to from here is something for the new nation to decide.

[1] R. J. Forbes — The Conquest of Nature.

[2] H. R. Mills — Teaching on Training.

[3] H. R. Mills — Teaching and Training.

[4,5] H. E. Kiewe. Africa: Make them Craftsmen.

SOME DIFFICULTIES IN IMPROVING THE QUALITY OF TEACHERS IN PAPUA NEW GUINEA

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Introduction

Beeby in his book "The Quality of Education in Developing Countries" introduces the term "quality" in a classroom context. It is his thesis that education in a developing country passes through a number of stages and that for a country to improve the quality of its education to a higher stage it must improve the quality of its teachers. This he states is not merely achieved by lengthening or upgrading the course of teacher education.

> "The majority of teachers in a system at stage 2 (formalism) cannot because of their limited general education be specifically trained to adapt successfully teaching techniques based on goals and the modern problem solving approach characteristic of stage 4."[1]

The factor which Beeby sees as determining in large measure the capacity of any school system to advance to a higher stage is the level of general education of its teachers.

Since Beeby's book was published in 1966 the level of general education of students on entry to teachers' colleges in Papua New Guinea has dramatically improved from secondary Form 1 or 2 entry, to the majority of students at Madang in 1972-73 now having Form 4 entry qualifications. This improvement in the general education of students has lead some teacher educations in Papua New Guinea to consider that progress through Beeby's stages has been taking place. Both Leach, 1972, and Smith, 1973, see this improvement in the general education of teachers as indicative of the fact that the more recent graduates of teachers' colleges have reached a stage bordering Beeby's stage of "Transition" and his highest stage of "Meaning"[2]

This paper questions whether improvement in the quality of recent student-teacher graduates is as dramatic as suggested by Leach and Smith, and whether Beeby's answer to improving the classroom quality of education is simply a matter of improving the general education of teachers.

The research documented in this paper examines the area of student-teacher 'authoritarianism' and 'nurturance' not considered by Beeby in his description of teachers at each educational stage.[3] The assumption on which the research rests is that among the qualities possessed by a teacher operating at the highest stage will be the personality characteristics of low authoritarianism and high nurturance. Similarly, for an educational system to move from Beeby's stage of 'formalism' to the stage of 'meaning', a corresponding improvement will be seen in the general education of the teachers and that these teachers will become less authoritarian and more nurturant in their attitudes toward children.

Research in Western countries indicates that courses in teacher education are generally effective in reducing conservatism, dogmatism and authoritarianism in student teachers and that gains have been identified in terms of warmth and rapport with children by trainees.[4]

Initial Focus of Enquiry: Do student-teachers in Papua New Guinea make similar gains during their two-year period of teacher education to students in Western countries?

The present author hypothesised following from the works of Hagen (1962),[5] who documented strongly authoritarian attitudes as characteristic of child-rearing practices in pre-literate societies, that no significant change in the authoritarian attitudes of students could be expected during their two years at teachers' college.

A second focus of the research examined the 'learning style' or 'educational set' of both teachers' college students and two samples of primary school pupils.[6] Determining whether the majority of students and pupils was either 'conceptually set' or 'factually set' appeared necessary to interpreting Beeby's stage of meaning within a Papua New Guinea context.

Methodology

The Minnesota Teacher Attitude Inventory (M.T.A.I.), used by Campbell in his Queensland study as a measure of nurturance, has been used in this study.[7] The testing was conducted at the commencement of teacher training at teachers' college. The M.T.A.I. is alleged by its authors to identify teachers who have and those who do not have good rapport with their pupils. Yee and Fruchter (1971) have analysed the factor content of M.T.A.I. and they reported that the items of the inventory measured 'a permissive, accepting, warm, sympathetic, supportive attitude towards children', in contrast to 'an authoritarian, pessimistic and reproachful evaluation of children'.[8] Other important factors identified were: the conflict between teacher and pupil in interests; the rigidity and severity of teachers in handling pupils; and the teacher's attitudes towards pupil's independence in learning.

To measure 'Authoritarianism' the California F scale was used at the commencement and the completion of teacher training.[9]

The student-teachers' 'directiveness' was measured during their 'practice teaching' using a variant of the "S.P.O.T.S." technique.[10].

This modification of the test was devised so that it could be used by students as a self-assessment of their teaching styles. This student self-assessment was completed by a group of the second-year students prior to their graduation.

To measure other general attitude changes, which are typical of students during their two years at a teachers' college, the "Study of Values" by Allport, Vernon and Lindzey was administered at the commencement and replicated at the completion of the students' teacher-training course.[11]

In order to gain some idea of the extent of 'field dependence' among students, which in turn provides a clue to the students' style of learning, an 'embedded figures test' was administered to second-year students and to two control groups which comprised primary school pupils.

Finally, to compare initial specified attitudes with those measured prior to the students' graduation, the Mann-Whitney U statistic at a .05 level of significance on a one tailed test was applied.

Results

The results of the M.T.A.I. tests are set out in Table 1. A mean score of –24.14 for the graduating student-teachers indicated that they were very low in nurturance and had only made slight, but not significant, gains during their two years at teachers' college. Compared to norms of student-teachers in the U.S.A., the measures of nurturance of these Papua New Guinean student-teachers would be below the fifth U.S.A. Percentile Rank. However, compared to Daeufer and Leton's study (1969) the Madang students were not significantly different from other graduating student-teachers from Micronesia.[12]

TABLE 1

Minnesota Teaching Attitude Inventory
Mean Scores for Madang Teachers' College Students 1972-73

	Feb.'72	*Nov.'72*	*Feb.'73*	*Nov.'73*	*05. Significance*
1972 Intake N.90	$\bar{X}$–30.29	$\bar{X}$–26.31		$\bar{X}$–24.14	N.S.
1973 Intake N.140			$\bar{X}$–33.56	$\bar{X}$–29.17	N.S.

The F scale results are presented in Table 2. On the seven-point scale used, a mean of 4.86 for a graduating student and a mean of 4.53 for a graduating headmaster were indicative of fairly strong authoritarian attitudes. The results revealed that no significant change took place among students during their two years at college. The F scale scores of graduating student-teachers in the U.S.A. presented by Scarr (1970) range from a mean of 3.15 to a mean of 3.36. Innocent comparison would suggest that Papua New Guinea student-teachers were considerably more authoritarian in attitude than their American counterparts.[13]

TABLE 2

Mean F Scale Scores presented as Item Averages
for Madang Teachers' College Students 1972-73

	Feb.'72	*Nov.'72*	*Feb.'73*	*Nov.'73*	*05. Significance*
1972 Intake N90	4.64	4.67		4.86	N.S.
1972 2nd Year Students N.120	4.72	4.92			N.S.
1973 Intake N.140			4.58	4.74	N.S.
1973 Headmasters' Course N.22			4.64 (July)	4.53	N.S.

The S.P.O.T.S. technique is purported to be a practicable, reliable and valid measure for assessing teacher 'directiveness'. A low score is deemed to indicate that the teacher has a 'directive' teaching style. Following a practice teaching period prior to graduation, fifty-five second-year students completed anonymously the S.P.O.T.S. schedule to appraise their own teaching style.

On the nine point scale used the mean of means was 4.1 and this was taken to infer that the student-teachers, by their own judgment, saw themselves as tending to be 'directive' in their classroom manner.

Figures 1 and 2 outline the pattern of values of the separate groups of male and female students. The measures of both groups revealed a similar trend which indicated little difference in their values over the two years at teachers' college.

Within the pattern, previously mentioned, religious and social values were strong and political and aesthetic values weak.

Surprisingly in that initial year of Self Government, the student-teachers showed a markedly low interest in political matters.

Two points seem worthy of attention in regard to the pattern of values established. First, the weak aesthetic value scores must be interpreted with caution as the questions used to measure this value lacked appropriateness to Papua New Guinea. Secondly, of some interest to the Missions will be the finding that the majority of the student-teachers retained their strong religious values while at Madang Teachers' College.

Figure 1
Profile of Values of Female Students at
Madang Teachers' College 1972-73

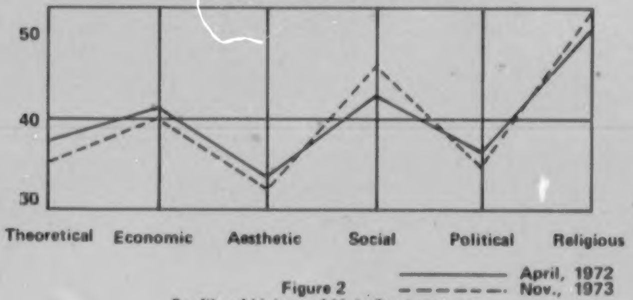
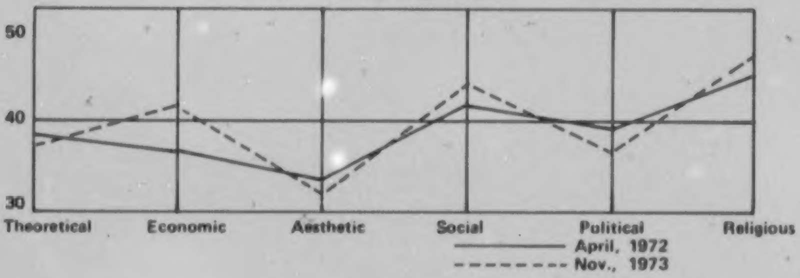


Figure 2
Profile of Values of Male Students at
Madang Teachers' College 1972-73



The results of the embedded figures test are presented in Table 3. As demonstrated by Witken *et al.* (1972), field independence, or differentiation, may be expected to improve until seventeen years of age approximately.[14]

From the data titled Table 3 it may be inferred that the student-teachers who were tested at the age previously mentioned of maximum development in differentiation were in fact only at a comparable score level to that achieved by the expatriate, selected mixed race and Papua New Guinea pupils in standard six at the Madang Australian Curriculum School. On the other hand, the Sagalau children, following a Papua New Guinea curriculum, were significantly more field dependent ($<.01$) than the Madang children.

TABLE 3

Embedded Figures Test Scores for Teachers' College and Primary School Pupils in the Madang Area — October, 1973

		Level of Significance
Teachers' College No. 92 (Second year students)	$\bar{X}$ 28.66	N.S.
Headmasters in Training N.22	$\bar{X}$ 26.33	N.S.
Madang Primary (Std. 6 Aust. Curriculum) — Expatriate N.15	$\bar{X}$ 29.5	N.S.
— Papua New Guinea and Mixed Race N.10	$\bar{X}$ 32.5	
— Total Madang Primary N.25	$\bar{X}$ 30.7	0.1
Sagalau (Std. 6 Papua New Guinea Curriculum) N.27	$\bar{X}$ 23.4	

Conclusions

It may be inferred in view of the findings of this research that students at Madang Teachers' College during 1972-73 were weak in nurturance and strong in authoritarianism and furthermore than no significant change took place in these attitudes during the two years the students were in college. Since it had been assumed for the purposes of this research that weak authoritarianism and strong nurturance are important qualities for a teacher at Beeby's stage of Meaning, the inference distilled is that the majority of researched student-teachers had not attained desired levels of these qualities that are found in teachers of Beeby's highest level.

In addition, it was found that the majority of student-teachers and children in the research samples were classified as field dependent. The corollary of this finding, namely that such young people have a 'factual learning style' rather than a 'conceptual learning style', has importance for future curriculum planning in Papua New Guinea.[15]

The recent history of curriculum development in Maths and Science at the primary school level in Papua New Guinea has been a "Conceptual-discovery" approach which has neglected to take account of the fact that many Papua New Guinean children have a 'factual learning style'.

A Plea: It is implored that wider research be conducted to establish whether these findings can be verified in other areas of the country. Should similar results be obtained then cognizance of this basis of learning should then be reflected in future curriculum planning and subsequent curriculum developments.

Further Implications

It has been implied in this paper that a course of teacher education has been unsuccessful in helping Papua New Guinea students make signficant gains in nurturance. The cause of this circumstance is suggested by such writers as Hagen (1962).[19] He asserts that the traditional pre-literate society and the authoritarian personality co-exist and that this personality trait of authoritarianism is predisposed by the child-rearing practices of such a society.

Hagen further contends that the pre-literate society whose members become generally less authoritarian is the one that implements a rapid economic advance while its members accept the introduction of supportive technological advances and a continuing search for innovation and further progress. It appears, therefore, that it will be only at a similar stage of development in Papua New Guinea that it can be expected that teachers who themselves have had a less authoritarian and more nurturant child rearing will display this nurturance in their attitudes toward children. To have the majority of teachers at Beeby's stage 4, Papua New Guinea must await a change in the social personality of the society itself.

However, it should be understood that what constitutes stage 4 or 'meaningful teaching' in a highly developed Western nation may not be feasible or even desirable in Papua New Guinea. As an example of a lack of cultural consonance, the "conceptual-discovery" approach adopted in Maths and Science in Papua New Guinea has been cited. The apparent failure of some of these programmes stems from the fact that many pupils and teachers alike cannot adapt adequately to this approach to learning.

Further, an authoritarian society typically values conformity, yet stage 4 teaching is based on independent and divergent thinkers and a good measure of individualism in both pupils and teachers. Already many Papua New Guinea school children are socially divorced from their parents and village society. If these qualities are made educationally desirable for the majority, the social gap between the village and the school will be widened.

In addition, schools at stage 4 level of teaching need substantial library and suitable resource materials to support programmes of individual pupil assignments. In the typical economic circumstance of compromise, found in all developing nations, it would be unwise to provide too rapidly vast sums of money needed to equip all of the schools with the elaborate materials needed for stage 4 teaching.

If it is not yet feasible to produce teachers at Beeby's stage 4 level of meaning, what realistic goals are there for teacher education in Papua New Guinea?

It may be contended that Papua New Guinea can have as a suitable education goal the attainment of meaningful teaching within the present stage 2 or lower stage 3 of Beeby's framework. Another research infers that teachers value and rely on the detailed 'Programmes of Work' prepared by the Department of Education.[20]

In particular, it appears a practical suggestion that considerable effort be expended in research, preparation and extension of further teacher-oriented 'Programmes of Work'.

Concomitantly, there is a definite need for student-teachers to learn to use these 'Programmes of Work' more effectively. Students need to learn how: to assess the level of ability of children; to be able to follow a programme at a pace in keeping with the ability levels of the children; to know when a certain section of work should be repeated; and to know when it is time to move on. Also there is the need for student-teachers to learn how to adapt a programme where only a syllabus outline exists. Fundamentally, schools in Papua New Guinea need to make education more relevant to the child. Thus, programmes in cultural studies and agriculture will hopefully play an increasing part in education in the immediate future.

Teachers' college staff have been represented on syllabus revision committees in the past, however, there is much that college staff members could do in initiating curriculum development, for they are in the unique position of seeing the difficulties faced by students in using lesson materials.

The above merely represent a few suggestions aimed at improving the quality of teaching in Papua New Guinea. The positive points made in this paper, however, are that it is unrealistic to talk about improving the quality of teaching to Beeby's highest stage of meaning and that the immediate goals must be the attainment of education relevance and meaningful teaching within Beeby's stages of 'upper formalism' or 'lower transition'.

[1] Beeby, C. E., *The Quality of Education in Developing Countries*, University Press, Cambridge, Mass., 1966, p. 88. Stages described by Beeby include Stage 1 Dame School; Stage 2 Formalism; Stage 3 Transition; Stage 4 Meaning.

[2] Leach, G. J., *An Education Curriculum for Papua New Guinea Preservice Student-Teachers*. A paper presented in connection with M.Ed. studies, James Cook University, 1972. Mimeo, p. 17.
Smith, K., *A Rationale for Future Planning of English Courses 1974 and Beyond*. A paper presented in connection with M.A. studies in Psycholinguistics, Essex University, 1973, p. 3.

[3] An authoritarian person is characterised by compulsiveness, rigidity, intolerance of ambiguity, submission to power, conventionality and punitive morality.
A nurturant person tends to be warm, accepting, sympathetic, permissive and supportive in attitudes.

[4] Mazer, G., "Attitude and Personality Change in Student-Teachers of Disadvantaged Youth", *The Journal of Educational Research*, Vol. 63, No. 3, 1969, pp. 116-120.
Scarr, S., "How to Reduce Authoritarianism among Teachers: The Human Development Approach". *The Journal of Educational Research*, Vol. 63, No. 8, 1970, pp. 367-372.

[5] Hagen, E., *On the Theory of Social Change*, The Dorsey Press, Illinois, 1962.

[6] 'Educational set' or 'learning style' refer to the method of study best suited to a student. A child who learns best by discovery methods is considered to be 'conceptually set'. A child who finds this form of learning difficult and prefers 'rote' learning methods is considered to be 'factually set'.

[7] Campbell, W. J., "Some Effects of Affective Climate on the Achievement Motivation of Pupils" in *Scholars in Context: The Effects of Environments on Learning*, ed. Campbell, W. J., John Wiley & Sons, Sydney, 1970.

[8] Yee, A. and Fruchter, B., "Factor Content of the Minnesota Teacher Attitude Inventory". *American Education Research Journal*, Vol. 8, No. 1, 1971, pp. 119-133.

[9] Adorno, T., *et al., The Authoritarian Personality*, Harper Bros., N.Y., 1950.
In both the M.T.A.I. and the F scale the sentence structures of the items were simplified to ensure that the items were understood.

[10] Tuckman, B., "A Technique for the Assessment of Teacher Directiveness", *The Journal of Educational Research*, Vol. 63, No. 9, 1970, pp. 395-400.
Teacher 'directiveness' refers to a classroom interaction pattern dominated by the teacher.
"S.P.O.T.S." (Student-teacher/tutor Perception Of Teaching Styles).

[11] Allport, G., Vernon, P. and Lindzey, *The Study of Values*, Houghton Mifflin and Coy., 1970.

[12] Daefer, C. and Leton, D., *Model Elementary Teaching Stations Micronesia: An Evaluation Report*, Department of Education, Trust Territory of the Pacific Island, 1969.

[13] Scarr, S., op. cit.

[14] Witkin, H. A., Goodenough, D. R. and Karp, S. A., "Stability of Cognitive Style from Childhood to Young Adulthood" in *Learning Performance and Individual Differences: Essays — Readings*, ed. L. Sperry, Scott Foresman & Coy., Glenview, Illinois, 1972.

[15] In keeping with this statement, Eysenck, for instance, asserts that many of the newer educational techniques now widely embraced such as the conceptual mastery of materials and the use of discovery learning may in fact defeat the child who comes from a less socially advantaged background.[16]
Bruner's comment on Eysenck's position is:

> "It is an important criticism, and while not all the evidence is in there is enough of it at hand to suggest caution. None of us knows whether and in what combination social class and genetic variables lead the less advantaged child to be more or less 'conceptual' or 'factual' in approach".[17]

Research by Brinkman would further support the position of a connection between field dependence and a factual learning style—

> "The conceptually set and factually set learners do tend to have characteristic modes of learning and thinking which are representative of their overall pattern at adjustment. To attempt to improve a person's learning ability by altering his educational set in a conceptual direction is to view this phenomenon in grossly oversimplified terms".[18]

[16] Eysenck, "The Inequality of Man", Temple Smith, 1973.

[17] Bruner, J., "Advocate Eysenck versus Scientist Eysenck and the Conflict Environmentalist", *Time Educational Supplement*, 16-11-73.

[18] Brinkman, E., "Personality Correlates of Educational Set in the Classroom", *Journal of Educational Research*, Vol. 66, No. 5, Jan., 1973.

[19] Hagen, E., op. cit.

[20] Larking, L. G., Roles and Role of Conflict of Teachers in Papua New Guinea, unpublished M.Ed. thesis, University of Queensland, 1972.

THE 1971 REPORT ON HIGHER EDUCATION IN PAPUA NEW GUINEA — A LOOK BACKWARDS AND FORWARDS

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SUMMARY

The author was a member of the Brown Committee established in 1970-71 by the Commonwealth Government of Australia to inquire into higher education in Papua New Guinea. In this paper the recommendations of the Report[1] and the reasons for making them are reviewed along with possible implications of delays in acting on some of the major recommendations. Current changes in manpower requirements from those of 1971 are also considered.

1. INTRODUCTION

Late in 1970, the Commonwealth Government of Australia established a committee to advise it on aspects of higher education in Papua New Guinea. The terms of reference of the Committee[2] were as follows:

> In the light of the Government's announced policies and programmes and the need to develop institutions and courses related to the Territory's needs, to inquire into and make recommendations in respect of institutions that conduct post secondary and tertiary courses on,
>
> (a) The immediate changes considered desirable to rationalise and coordinate development of the institutions to achieve —
>   i. Balanced growth of enrolments in keeping with the availability of school leavers and the projected demands within Papua New Guinea for trained manpower;
>   ii. Maximum ecconomies of scarce staff and physical resources;
>
> (b) The longer term changes considered desirable for these purposes and the nature, composition and powers of permanent machinery required to achieve them and advise the Government on these matters;
>
> (c) What it considers to be the most suitable arrangement for the management of institutions, other than the University and the Institute of Technology, including any variations desirable in the conditions of service of their staffs;
>
> (d) The arrangements considered desirable to determine the status of the various academic awards, including the criteria that should be used to assess courses and ensure consistency of nomenclature.

At its first meeting in December, 1970 the Committee prepared its plan of action after being briefed by Mr. C. E. Barnes, then Minister for External Territories.

During the tenure of the Committee a select committee recommended that the country should be prepared for self-government by 1976. The questions of self-government and independence were then, as now, major political issues in Papua New Guinea.

Major stated objectives of the Government's programmes of development in Papua New Guinea were to "increase products from agriculture, livestock and forestry and to promote the advancement of the people through training and education".[4]

Having in mind the economic and political conditions in Papua New Guinea, and realising that the country was in a situation of rapid change, the Committee "tried to avoid making recommendations which would reduce the options open to the Papua New Guinea government which will take over authority in the near future".[4] Thus, though the Committee could see itself free to make firm recommendations in some cases, in others it refrained from so doing. Rather it planned to create a situation where changes could be made easily should a new government make a different assessment of the situation.

Hence the Committee saw as one of its most important objectives the establishment of machinery within which institutions of higher education could function efficiently and in co-operation to best aid the Government in developing Papua New Guinea.

It was noted that in developing countries such as Papua New Guinea, development programmes will involve a greater degree of overall government control and direction than would be the case in more developed countries. This factor also influenced the Committee's thinking.

One important matter referred to the Committee was the determination of manpower requirements and the priorities to be allocated in this respect.

Considering that:

i. the time to educate professionals and follow this with appropriate work experience to make them efficient and effective operators is considerable, and

ii. the number of high school leavers prepared for education in professional fields is limited by the number of high school places and teachers available,

it becomes apparent that time was vital and that the Report should be issued and implemented as soon as possible.

To enable it to prepare the Report the Committee made visits to various parts of Papua New Guinea, including Bougainville, met with educators and students, politicians and other prominent citizens, employers and other interested people, and visited educational facilities and projects involving manpower. The Committee made four visits to Papua New Guinea and had several meetings in Australia to sift the information obtained in order to formulate recommendations.

The final Report was presented to Mr. Barnes on September 14, 1971.

Since that time Papua New Guinea has achieved self-government well in advance of what appears, to the Committee, a very optimistic date. Thus logically it could be expected that the implementation of the Committee's recommendations should be accelerated.

However, at the time this paper was prepared the only positive action taken at Government level to implement the Report's major recommendations has been the drafting of proposed legislation, the creation of the office of Higher Education and the establishment of a three man committee to consider universities' finances for 1974-75.

In the following sections of the paper the various recommendations and the reasons underlying them will be discussed and finally some of the possible implications of delaying their implementation will be considered.

2. PROFESSIONAL MANPOWER REQUIREMENTS

At first sight the task of advising on the professional manpower requirements to ensure the development of Papua New Guinea appeared formidable. The Committee considered submissions from individuals and organisations regarding manpower requirements, and sifted through manpower surveys and predictions made at various times.[5] As these predictions were not made with the Committee's terms of reference in mind, careful study and analysis was required. Predictions were based on a 1966 census which was a sampling rather than a full census. Consequently their accuracy could suffer.

The Committee also examined throughput rates of primary and secondary schools and the maximum numbers of student through these and teachers colleges in the near future. From the considerable array of material considered, some of which is listed in the bibliography,[6] it finally became clear that, because of the particular situation in Papua New Guinea, the task of predicting manpower training requirements might not be as difficult as it would have been in Australia. Two points became apparent.

i. The available trained manpower could not meet all needs immediately or in the longer term and consequently priorities would have to be set.
ii. In terms of the Government plan of development for Papua New Guinea professional manpower requirements in the Public Service, business, scientific, engineering, medical and allied fields could be determined fairly easily.

The Committee also noted that the Papua New Guinea Manpower Unit, which had divided the workforce into five manpower groups, Classes A to E, respectively[7] had determined that the overall manpower supply and demand would be approximately equal for the 1971-76 period. However it had established that there would be heavy shortfalls in the professional and subprofessional classes (the first required 3,929 with a supply of 588 and the second required 6,635 with a supply of 3,831) with a substantial oversupply of "skilled workers".[8] Unfortunately most of these have had only limited high school training and are not equipped for employment in most skilled occupations.

The Report proceeds to detail the professional manpower requirements (other than for public administrators and teachers) together with the supply expected from existing or currently proposed educational facilities. The position is summarised in Table I.[9]

TABLE I

PROFESSIONAL MANPOWER
ESTIMATED TOTAL DEMAND AND INDIGENOUS SUPPLY

Category	1971 To 1976				1976 To 1981			
	Additional Manpower Required	Expected Indigenous Supply (a)	Shortfall	Percent of current Availability to meet Demand	Additional Manpower Required	Expected Indigenous Supply (a)	Shortfall	Percent of current Availability to meet Demand
Air Pilots/Engineers	240	(b)	240	—	300	(b)	300	—
Architects	76	14	62	543	129	98	31	132
Civil Engineers	214	35	179	611	342	116	226	295
Electrical Engineers	67	12	55	558	109	60	49	182
Mechanical Engineers	33	25	8	132	39	65	—26(c)	Nil
Surveyors	117	22	95	532	185	86	99	215
Accountants	317	45	272	704	527	96	431	549
Physical and Biological Scientists	368	26	342	1,415	612	105	507	583
Lawyers	123	18	105	683	202	34	168	594
Medical Practitioners	184	34	150	541	228	51	177	447
Dental Practitioners	29	13	16	223	45	25	20	180
Administrators	182	58	124	314	221	194	27	114
Managers	1,133	37	1,096	3,062	1,845	64	1,781	2,882

Note: (a) Numbers were estimates from courses conducted or approved. They did not include Committee's recommended increases.

(b) Training programme was under review. There were four indigenous trainee pilots in 1971.

(c) The negative sign indicated a surplus.

Whilst actual shortfalls are considerable and suggest there is not much movement towards localisation the "percent of current availability to meet needs" figures are more hopeful. Thus there were expected shortfalls of 55 electrical engineers in 1971-76 and 49 in 1976-81. However, whilst the output of 12 in 1971-76 would have to be increased nearly 6 times to meet the needs, a doubling of the 1976-81 output would more than meet them.

It is noted that in almost all cases some increases in indigenous graduate output would be necessary to completely meet requirements, but that in many instances this increase was not great. In fact mechanical engineers could be in oversupply in the 1976-81 period. The figures led the Committee to comment that localisation in most professions should be possible by the mid-1980's.

This seemed a realistic target date for it was noted that most professionals would need four of five years after qualifying from courses before they were efficient practitioners. A further period of about five years' experience would be desirable before they could be expected to effectively occupy senior positions. Thus a period of ten to fifteen years (including tertiary education) would have to pass before full localisation would be possible with the process beginning in lower level positions.

The Committee also felt obliged to write that "we do not see much likelihood of this general situation being improved even with the expenditure of greatly increased resources. Professional people cannot be trained overnight. But . . . the demand for professional people at least in the engineering fields could decrease considerably if the numbers of semi-professional technicians were increased".[10] Notwithstanding this the Committee believed the shortfalls in civil engineering, accountancy, and physical and biological science were of concern and recommended increasses in output of 50%, 300%, and 220% respectively to make localisation by the mid-1980's a reasonable target.

Because of the time required for post graduation practice it was believed that localisation of lawyers could not be achieved till the end of the 1980's. Likewise indications were that expatriate doctors would be required for many years to come.

Although the Committee did not have sufficient information available it believed that the number of required managers would include a majority not requiring full professional qualifications and that those graduated could well be sufficient to meet professional needs. Others could be trained in appropriate short courses.

To meet the proposed extra outputs of professionals at present throughput rates for tertiary institutions would have required nearly 300 more students from high schools each year. Whilst the Committee felt this number could be available, it was concerned at the extra costs involved which were estimated at $4 million annually plus $9 million for capital expenditure — costs it did not believe could be justified, as only about one third those entering educational institutions graduated. Hence it strongly recommended that the Tertiary Education Commission should give serious consideration to ways of improving the throughput in professional courses.

3. SUB-PROFESSIONAL, SKILLED AND SEMI-SKILLED MANPOWER

In the Report a detailed analysis is made of the supply and demand of manpower in these categories. Special tables refer to training for public service positions; for clerical and allied trades; for building, carpentry and related trades; for mechanical, electrical, metalwork and related trades; and for other miscellaneous trades.[11]

Whilst there were shortfalls the Committee was generally happy to note that the development programme appeared to be producing a suitable number of trained people. This was particularly true in the Public Service, and clerical and allied trades, where it appeared that full localisation would be achieved in the 1971-76 period.

In the building and allied trade areas numbers were considered satisfactory, though there was a shortfall of 1,000 in the 3,500 required carpenters, joiners and cabinet makers. However, the Committee believed the number being trained would be sufficient to fill the "highly skilled" positions with the rest being prepared via "on the job" training. Hence no changes were recommended.

In connection with mechanical, electrical, metalwork and related trades, fairly general shortfalls were noted but it was believed most of these could be overcome by "on the job" training. However, the supply of electricians and industrial engineering technicians caused concern. Whilst 830 electricians, radio mechanics, and telecommunications technicians were required in 1971-76 for localisation, only 485 were expected to become available. The provision of 125 extra training places per year would overcome this problem. Likewise for engineering and other technicians the shortfall (200 supply as against 830 required) could be met by providing approximately 75 extra places per year, and recommendation for these extra places was made. (The cost to provide training for these extra students would be only of the order of $400,000 capital outlay and $160,000 recurrent cost per year.) With the provision of these extra places it was believed localisation in all manpower categories considered in this section could be achieved by 1976.

In seeking to optimise the use of available resources the Committee noted there could be dual use of equipment by students training as professionals, and as semi-professional technicians and hence recommended strongly that in Papua New Guinea duplications of facilities should be avoided by using relevant laboratories and other facilities of the University and Institute of Technology for semi-professional courses. Likewise it recommended that industrial technician courses be offered in technical colleges where facilities could be used for the dual purpose of educating tradesmen and industrial technicians. In particular and having the peculiar conditions existing in Papua New Guinea in mind the Committee recommended that the Institute of Technology should offer a range of semi-professional as well as professional courses particularly in the engineering fields. Whilst noting that the outlay of comparatively small additional funds as recommended should give localisation by 1976 for technician and skilled personnel and the mid-1980's for most professionals the Committee considered that much additional training could be achieved at low cost in vocational centres which are set up throughout the country to introduce rudimentary skills to those who cannot win places for training as skilled through to professional people.

4. TRAINING OF TEACHERS AND PUBLIC ADMINISTRATORS

These areas involved large numbers of workers and were considered separately in the Report. The expected shortfalls of trained teachers was so great that large numbers of expatriates must be used for many years.

Public administrators, particularly those in senior positions, have a vital role in aiding the new Government in self-government and finally independence. And it appeared that, whilst specialist expatriates could continue to be employed to work within government policy in many fields, it would be nationally desirable that government advisers should be indigenous people.

4.1 The Training of Teachers

For a literate population universal primary education is a prime need. Likewise a sufficient number of secondary high school places must be provided to ensure the flow of students into technical colleges, argicultural colleges, universities and institutes of technology to provide the skilled manpower already referred to in sections 2 and 3.

Though beyond the scope of this paper, the section in the Report detailing the development of the primary and secondary teaching services in Papua New Guinea is of considerable interest.[12]

It was only after World War II that the Papua New Guinea Administration entered the field of education and considering the handicaps — practically no indigenous teachers, limited funds, an ethnic group with ways quite different from those in Australia, an adult population mostly uneducated by our standards and unable to speak English, the language of instruction — its endeavours are commendable. Prior to the advent of Administration Schools all teaching was done by the mission based schools. The growth in importance of Administration Schools is illustrated by the figures below.

TABLE 11[13]
INDIGENOUS PRIMARY ENROLMENTS

Year	School Type			Total Enrolments
	Administration	Recognised Mission	Unrecognised Mission	
1967	12,364	0	156,344	168,708
1957	67,982	131,299	38,905	238,186
1970	79,924	131,918	30,000 (a)	241,842

Note: (a) This is an estimate, as no records were kept.

The upgrading of mission schools to standards set by the Administration (recognised mission schools) is noted as is the considerable growth in the numbers in Administration Schools.

The situation in Papua New Guinea at the time of the Committee's inquiry can be best illustrated by quoting from the Report.[14]

> The Pupils
>
> 2.27 . . . (Unlike) Australia, going to school in Papua New Guinea, is . . . something of a hazardous undertaking . . . (A) child in Papua New Guinea has on average only a fifty-fifty chance of going to school at all . . . (In) many villages he has no hope at all of attending school . . . If he does get into a primary school, it is unlikely that...he or his parents will have any real idea of what it is all about. Education is something brought by the Europeans, and, as the majority of schools are operated by churches or missions, is often associated with the Europeans' religion . . .
>
> 2.28 Having begun primary school . . . the child has . . . to learn the Europeans' language. In most cases his parents will not speak English and it is quite likely that his first teachers will not have a very good command of the language . . . (He) will also have to acquire an equally foreign range of concepts. Basic ideas of number, quantity, time and space are often quite different from the Western concepts, and the child entering school will probably have had none of the learning experiences in these concepts that his Australian counterpart has had through his play, language learning and his everyday experiences.
>
> 2.29 With difficulties such as these . . . many children who start, do not complete their primary education. Under the new education system it is hoped that by 1976 three-quarters will get to standard 4 and 60% to standard 6. With standard 6, however, comes the Primary Final Examination on which the child's future education largely depends. Only about 40% to 50% of those in standard 6 will be able to find a place in a high school . . . If he does not win a high school place the child has some chance of going to a vocational centre, but for most this is not possible. Students who have missed out on entry to high schools generally feel a deep sense of failure if not shame; some have been known to travel hundreds of miles to other districts in search of a place they were unable to gain in their own district.
>
> 2.30 Having won his high school place . . . most of his teachers will be Europeans. In general they will be young Europeans . . . (who) however well-intended, will have little appreciation of his background, his different ways of thinking, his difficulty with the English language or the sensitivity of his feelings. Despite the improving retention rates under the new system, there is still some chance of his dropping out of Form II. One-quarter of the students will also transfer to technical college at this level. Truly a difficult situation!

The adequate training of a sufficient number of indigenous teachers to restaff the largely expatriate teaching service is a large task. The Committee noted that by 1980 more than half would still be expatriate despite endeavours at localisation.

As a guideline the Committee accepted the Government's desire to build up a total primary teaching force of about 11,400 by 1980 to permit at least 50% primary school population enrolment in all districts provided adequate expatriate recruitment was possible. Unfortunately expatriate recruitment was then lagging. The Committee saw a need for an additional 150 teacher training places by 1975 with a further 300 to 400 per year up to 1980. It was concerned to note that even with these considerable increases in primary teacher training places the goal of 50% primary education enrolments would not be achieved by 1980. It was also noted that primary education was likely to take on a higher priority after self-government judged on activities in other developing countries, and that for universal education by 1990, some two thousand extra places per year would be required after 1980. This then points out the tremendous problem facing the country.

The need for expanded secondary education has been mentioned. In 1971 the predominantly expatriate secondary school staff numbered nearly 1,000 and the Committee estimated this would have to be increased to 1,660 by 1975 and 2,550 by 1980. This growth of more than 250% in 10 years would require 170 extra training places per year without allowing for wastage. In recommending the provision of 200 additional places the Committee was aware that the need for secondary teachers would not be met from indigenous sources but believed this would be a workable number of places and would not leave the Government with a surplus of training places once the backlog was overcome. With this scheme more than half the high school teachers would still be expatriates by 1980 but there would be a considerable move towards localisation by 1990. Undoubtedly the question of preparing an adequate number of teachers is one of the vexing problems of education in Papua New Guinea.

4.2 Education for Public Administration

Commenting on the role of administrative staff in developing countries the Report states:

> If experience in other places is any indication of what will happen when Papua New Guinea becomes self-governing, it is safe to assume that, of all areas, public administration will be the most sensitive politically. Localisation of administrative staff is of critical importance in that public confidence must be secured by the knowledge that it is local officers who have responsibility for advising Ministers for initiating policy recommendations and for implementing policy decisions . . . (The) Administrative College is a key Government instrument in implementing localisation policy. It must be Public Service oriented, even though it will make use of facilities outside the Public Service in doing its work . . . The Government must decide what kind of Public Servce it wants and what kind of administration it wants. The Administrative College must accept the lead when it is given. Consequently it cannot expect to have autonomy at this stage.[15]

The Committee has access to the white paper "Accelerated Localisation and Training relating to the expansion of the Administratian College" (as tabled in the House of Assembly on August 30, 1971) and strongly recommended that the proposals to expand the facilities at the Administrative College be expedited.

In keeping with views expressed above and noting that whilst the Administrative College was located next to the University of Papua New Guinea in Port Moresby, the local Government College at Vunadidir was poorly located and with poor facilities, the Committee recommended that local government training also be conducted at the main Administrative College.

Whilst there should be close liaison between the University and the Administrative College, the College should, for the time being, remain as a governmental instrumentality responsible to the Public Service but under its own ordinance and council. The Committee did not see this as a permanent state but rather one essential in the early years of independence.

5. THE CO-ORDINATING MACHINERY AND ORGANISATION OF TERTIARY INSTITUTIONS

This section of the paper can be introduced by a quotation from the Report.

> Our terms of reference ask us to make recommendations about the nature, composition and powers of permanent machinery required to rationalise and co-ordinate development of institutions that conduct post-secondary and tertiary courses. This is the central and probably the most important of our duties.[16]

The Report contains recommendations in two parts. The first in Chapter 7 refers to the formal machinery to rationalise and co-ordinate development. The second, in Chapter 8, relates to the prolification of educational institutions and associated problems and suggests ways in which these problems should be tackled.

5.1 The Co-ordinating Machinery

The Committee noted that little co-ordination existed in higher education in Papua New Guinea. In considering the form of a suitable co-ordinating body, the peculiar problems of Papua as a developing country had to be considered. The classic problems of co-ordination and rationalisation in tertiary education — efficient allocation of resources, the provision of the right number and type of institutions, adequate numbers of appropriate student places in educational establishments, adequate academic staff, and the need to achieve adequate student inputs and outputs — all had to be considered.

These are concerns of most bodies co-ordinating tertiary education including those in Australia. But Papua New Guinea has an added and vital factor to be considered. This is the need to use the educational system to develop the country according to prepared plans.

Thus the Committee considered the traditional form of co-ordinating committee, which is generally as independent of the Government as possible, was not appropriate to Papua New Guinea. Rather the body would need to liaise closely with appropriate government instrumentalities, in this case the Department of Education, the Office of Programming and Co-ordination (overall planning) and the Public Service Board.

Also, whilst it accepted that it may be considered illogical for educational establishments who were claimants for monies to be represented on the body considering those claims, it was believed that officers of senior educational establishments (the University and Institute of Technology) could contribute greatly to the development of the overall educational plan for the country.

To act as a counterfoil to official representatives, community representatives were also considered desirable and to ensure the body was not too large and at the same time was balanced, it was proposed those from the community should number three or four.

Finally it was considered desirable to have as Chairman, an independent who was not of the government, nor of any of the institutions directly concerned.

The recommended constitution of a Tertiary Education Commission was as follows:

An independent Chairman appointed by the Government.
The Director of Education.
The Director of the Office of Programming and Co-ordination.
The Chairman of the Public Service Board.
The Vice Chancellor of the University of Papua New Guinea.
The Director of the Institute of Technology.
Three or four members representing the community and appointed by the Government.

The broad function of the Commission was to advise the Government on the one hand and the various institutions on the other, on methods and means needed to provide, develop and co-ordinate higher education against the background of resources available for the purpose; and to help in developing the country according to stipulated programmes.

But what of that important function — the examining of requests for finance? The Committee recognised that wtth the structure proposed this was not an appropriate task for the Tertiary Education Commission.

Hence it recommended that a separate Tertiary Education Finance Board should be established but that its members should also be members of the Tertiary Education Commission in order that they could be fully conversant with the education system and planning and developmental programmes.

The Finance Board, whose proposed function was to examine and advise the Government on financial proposals of the University and Institute of Technology and on other financial matters in the tertiary education field was to consist of the Chairman of the Tertiary Education Commission and two others from that Commission provided they were not members of staff of institutions whose finances were under investigation.

In its final comments on machinery the Committee noted that in Papua New Guinea education "tertiary" would have a different connotation to that in Australia and hence prepared a list of institutions which it believed should be under the Tertiary Education Commission umbrella. Included in this group were senior high schools enrolling students at the grade five level (it was recommended that these should be junior colleges rather than high schools), technical and similar colleges graduating certificates and diploma holders, and all teachers colleges as well as the University and Institute of Technology.

5.2 Organisation of Tertiary Institutions

In this area the management of the University and Institute of Technology were specifically excluded from the Committee's terms of reference. As mentioned it was recommended these bodies should be represented on the Tertiary Education Commission but other institutions were not. The Committee saw a need to have a number of organisations concerned with tertiary education in clearly defined vocational areas, to act as forums for discussion of common educational problems and to advise the Tertiary Education Commission regarding the needs of these groups. The Committee looked at various common interests as focal points for such organisations but ultimately decided the common vocational factor was probably most relevant.

The matters to be discussed by members of these organisations were to include the following:

Levels of entry of students, rationalisation to best utilise academic staff in short supply, student selection, the student wastage problem, transfer of students between different educational institutions and other problems including that of resources needed. The Committee was aware there were many problems of concern to academic staff which could be minimised if not solved by discussions proposed and hence saw these Association of Tertiary Colleges as important organisations. Initially it suggested association could be formed in connection wieh teachers colleges, with paramedical institutions, and with technical colleges and others associated with engineering type education.[17]

It was proposed that committees for each group would have representation from all member institutions, from relevant faculties of the University and/or the Institute of Technology, together with representatives of future employers, and possibly others who could aid deliberations. Liaison with the Tertiary Education Commission was to be maintained by making the Chairman of each Association Committee a member of the Tertiary Education Commission.

6. OTHER RECOMMENDATIONS

The recommendations made included the following and it was anticipated that most if not all would have been referred to the Tertiary Education Commission:

i. The question of raising student throughput rates in professional courses
ii. The provision of further places for technician training and the determination of the fields in which they should be offered.
iii. The provision of additional places in primary and secondary teacher training colleges.
iv. The expansion of the Administrative College.
v. The offering of semi-professional courses at the University and Institute of Technology.
vi. The offering of industrial technician courses at technical colleges.

vii. The provision of facilities to equalise opportunities for females in higher education.

viii. The introduction of junior colleges (with appropriate staff and courses) to replace senior high schools.

ix. The phasing out of the preliminary year (or its equivalent) at the University and Institute of Technology.

x. The offering of standard qualifications:

Certificates	— industrial technicians — after form iv plus 1 or 2 years.
Diplomas	— semi-professional technicians — after form iv plus 3 years.
Bachelor degree	— professional — after form iv plus 4 or 5 years.
Honours degree	— professional — after form iv plus 5 or 6 years.
Postgraduate diploma	— after 1 year postgraduate studies.
Master degree	— after 2 years of postgraduate studies.

xi. The amalgamation of certain courses and activities associated with senior tertiary education bodies.

7. THE PRESENT POSITION

Unfortunately there has been limited action on the Committee's recommendations. It is understood this is not necessarily because of major disagreement with the Report but rather because the business of moving to self-government and independence has resulted in apparently less pressing matters being relegated.

Also Cabinet in Papua New Guinea appointed a Committee of Inquiry into University salaries, Subsequently the terms of reference of the committee with Dr. Gris as Chairman was changed to consider the best form of university development. As this could bring forward recommendations differing from those of the Brown Committee it has contributed to delays in implementation. These and associated matters together with the updating of manpower requirements will now be considered.

7.1 Co-ordinating Machinery

Draft legislation for a Higher Education Bill in Papua New Guinea has been prepared. It is believed this follows closely the recommendations made. However, in December, 1973, advice indicated Cabinet had not considered the bill fully, and evidence suggests such consideration will be deferred till mid-1974.

The Office of Higher Education which it is understood would service the Higher Education Commission has been established with a Director who is responsible to the Minister of Higher Education who is also the Minister of Education.

i. In July, 1973, K. S. Inglis, Vice Chancellor of the University of Papua New Guinea noted that though the formal responsibility for higher education still rested then with the Australian Minister for External Territories, higher education was a field "in which the Australian Government has evidently decided to take no further initiative".[18] Hence in the absence of the Commission or some similar body there is no official leadership other than that to be offered by the executive office of Higher Education.

ii. In the past the two universities in Papua New Guinea submitted rolling trienium submissions detailing their longer term planning and immediate and longer term financial needs. These were reviewed by Sir Leslie Melville who made recommendations to the Government. The Government could decide on grants to be made and be sure that educational plans were appropriate to its own development programme. This arrangement has now ended. Hence there was no official body to receive the submissions and comment on them. (It was expected this would be done by the new Tertiary Education Commission and the Tertiary Education Finance Board.) This resulted in concern at least to one of the senior educational institutes which assumed that "the Government does not wish . . . to have either of the two universities place before it major innovations not proposed in earlier submissions and subsequently approved".[18] However, it was hoped that machinery would exist for the consideration of a new submission for 1974-76, to be submitted early in 1974 in which fresh thinking regarding policy could be formulated. It is noted that subsequently a three man committee comprised of Messrs. Tigalai (treasury), Ianamu (President of the Amazon Bay Local Government Council) and Professor R. Karmel (Chairman of the Australian Universities Commission) was established to consider the universities' finance 1974-75.

Thus lack of implementation of the machinery recommendations appear to be inhibiting future positive educational planning.

iii. Many matters of importance requiring recommendations to the Government and/or policy decisions have not been considered so that delays of up to two years have occurred in these matters to date. Perhaps the most serious matters are those listed as i, ii, iii, iv, viii and ix in item 6. The question of raising throughput rates will need much consideration and careful action. For example the Committee noted annual costs of $4 million were needed to provide extra output in professional areas. However, it could not justify this because of the low throughput rate. Looked at another way it could be stated that large annual costs are being currently spent on failing students.

It is pleasing to note that some tertiary institutes are looking at some aspects of pass rates but the problem is one requiring a wide ranging analysis and the development of a detailed overall programme such as could be directed by a body similar to the envisaged Commission.

At the time of writing the author did not have full information to indicate the nature of action taken on recommendations. However, comments from various officers concerned with education in Papua New Guinea indicate that:

i. The number of training places for electricians and radio mechanics have not been appreciably increased and though technicians in Engineering training places are available they are not being filled.

ii. The number of students offering in some professional fields is quite inadequate and that ways of directing into appropriate courses should be devised.

iii. No attempt has been made to set up secondary teachers colleges near universities. However, there has been general agreement that the University of Papua New Guinea should take over Goroka Teachers College.

iv. The teacher training programme expansion falls short of recommended targets.

v. Little action has been taken to implement the senior high school/junior college recommendation and target dates of 1978 to 1983 have been unofficially mentioned.

On the positive side, the need for different types of technician training has been ascertained, assistance has been made available to help encourage females and married couples in higher education (apparently with a disappointing response) and very importantly, development of the Administration College is progressing well. Also the University of Technology is expanding its offerings in the semi-professional field and the two universities have cooperated in offering joint courses leading to degrees in forestry and agriculture respectively. But again these are all independent actions and the important co-ordination and fixing of priorities is lacking in the absence of a Commission. Integrated leadership is required to initiate action when and where appropriate.

7.2 Associations of Tertiary Colleges

As these have not been established (other than in connection with teacher education) the need continues for official forums to help in the co-ordination of tertiary education and in solving the many and varied problems of common interest to the diversified training establishments. Again it is heartening to see the co-ordination developing in some areas. But this usually occurs to meet a specific need and not the general problem. It seems that smaller establishments would still find it very difficult to find a forum for discussion of problems. Thus, because of the absence of a system similar to that proposed dialogue on the many common problems is still largely lacking.

7.3 Manpower Figures

Revised manpower figures[19] do not vary sufficiently from those in the Report to cause concern. Thus the only real concern now will be the possible lack of additional training places for industrial technicians, the lack of a firm decision regarding the provision of an adequate number of teacher training places, and the lack of positive action to ensure that students are enrolled in appropriate courses as determined by the development programme.

8. CONCLUSION

The findings of the Committee of Inquiry together with major recommendations have been considered. Some of the possible implications of the delay in implementing recommendations have been considered. Those of greatest concern are probably the lack of co-ordination and setting of priorities in tertiary education, the considerable continuing annual cost associated with low student throughput rates, the concern that adequate training places in appropriate areas may not be established to give the required balanced work force, the lack of forums where educators can discuss the many common problems of education in Papua New Guinea, the inhibiting effect on forward planning and the probable delay in achieving localisation.

It was noted that individual organisations were acting in accordance with some recommendations in the Report.

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[1] Ref. 1.

[2] Members were: Sir Allen Brown, C.B.E., M.A., L.I.B. -- Chairman; S. W. Cohen, M.A., Ph.D.,; V. S. Eri, B.A., M.A.C.E. (one of the University of Papua New Guinea's first graduates and one of Papua New Guinea's first indigenous authors)[3]; and A. H. Nash, B.Sc. (Eng.), B.Sc. (Hons.), M.Ed., Ph.D., F.I.E. (Aust.), F.A.C.E.

[3] Ref. 2.

[4] Ref. 1, p.1.

[5] Ref. 3, Chapter II, Ref. 4 and Ref. 5.

[6] Ref. 1, pp.80-88.

[7] Class A: Professional, Managerial and Related Workers.
Class B: Sub-professional, Higher Technical and Related Workers.
Class C: Skilled Workers.
Class D: Semi-skilled Workers.
Class E: Unskilled Workers, (Ref. 1, p.27).

[8] Ref. 1, p.28.

[9] Ref. 1, pp.28-30.

[10] Ref. 1, p.31.

[11] Ref. 1, pp.35-40.

[12] Ref. 1, pp.7-9.

[31] Ref. 1, p.9.

[14] Ref. 1, pp.15-16.

[15] Ref. 1, p.50.

[16] Ref. 1, p.60.

[17] Ref. 1, p.72.

[18] Ref. 6, p.1.

[19] Ref. 7.

THEOLOGICAL EDUCATION IN PAPUA NEW GUINEA

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This paper will be divided into three parts:—

(a) A brief historical sketch
(b) Teaching by Themes at Rarongo College
(c) Some questions about Theological Curricula

(a) A brief historical sketch.

The first theological College as such in Papua New Guinea was built by Dr. W. Lawes in Port Moresby in 1882. In 1884 the first student from this college was set apart for the Christian ministry. The lecture-method of taking notes, to be reproduced for the teacher in the exams was the norm of instruction. Methodists near Rabaul from 1885 and at Salamo from 1931, Anglicans at Dogura from 1912, in a very informal way followed this method of teaching. The Roman Catholics sent one man overseas to train for the priesthood and he was ordained in 1937; but there was no Roman seminary in P.N.G. until the Marist Bishop Thomas Wade opened St. Joseph's major seminary in 1946 on Bougainville. And up to the 1941 war, though they claimed sixty thousand converts, the Lutheran Mission had no ordained pastor: the college at Logaweng was opened in 1956. It seems that between the two wars very little advance was made in theological training; but the 1939-45 war changed many things and throughout the world there has been a great improvement in theological education, much encouraged by the Theological Education Fund of the World Council of Churches. In Papua New Guinea every church and group of churches has recently built or rebuilt its theological college. The Roman Catholics are at Bomana, the Lutherans at Lae, the Evangelical Alliance at Banz, the United Church near Rabaul, the Seventh Day Adventists near Kokopo and the Anglicans are building on the University site. And all the churches have radically revised their programmes. Most of the theological education now starts with students who have completed Form IV (R.C.s Form VI), as against twenty years ago when Standard VI was a high qualification. All are experimenting with new ways of teaching, though we have time here for examining only one entirely revised curriculum. (The others are covered in a fuller study.) Thus theological education is still in the van of educational development in this country, as it has always been.

(b) Teaching by Themes at Rarongo College.

The staff at Rarongo College were especially worried by the fact that students were not forming an integrated picture of theology. That the same concern was felt in Africa is evidenced by Sundkler, who devotes twenty pages to 'the search for an integrated curriculum'. The staff were also concerned that students were so often not learning, but simply reproducing notes. Therefore the College Council, which includes experts both clerical and lay in various fields, revised the curriculum, especially in relation to the first two years of the course. In this task it was assisted by Gaulim Teachers' College and Malmaluan Training Centre and gladly acknowledges their help. The 1970 intake — the academic year in Papua New Guinea begins in January — was the first group to study under the new curriculum.

(a) The method used in the course.

For the first two years there is a general introduction that lasts for four or five months; and then instead of teaching by subjects, for example Old Testament, Pastoral Theology, Church History, a variety of significant themes is studied. Two or three weeks are devoted to each theme and the attempt is made to look at it from every possible theological angle. The example of suffering is given below.

A start is often made with a role-play. In this case it may be about someone suffering from incurable cancer, or a pastor visiting the parents of a child who has recently died. It may be about a young Melanesian Christian confronted with the evil power of black magic. Thus an initial attempt is made to root the whole study in the life-situation of the ministry in Papua New Guinea. As a result of the role-play, many questions would normally be raised about God and His care for His people. So one passes naturally into the theological themes of providence, pain and, if one is not careful, into all the realms of sin, the study of which could of course occupy a whole term. Assignments would have been set at the beginning of the series on the Exodus, or Job, the Suffering Servant in Isaiah, Jeremiah or Hosea. All the students in the group could take the same passage, or they could be divided so that insights could be gained into the various parts of the Old Testament. The experience of the Old Testament heroes contributes to a contemporary understanding of what God means by allowing suffering in His World today.

If the students are alert, it may well be that they will turn to questions of man's inhumanity to man, in Vietnam, South Africa, Pakistan or Ireland — particularly if they happen to be called Christian countries; and they may also ask about God's inhumanity to man in earthquakes, pestilence and flood. Studies will be undertaken, alone or in small groups, of I Peter — one of the fullest New Testament treatments of the subject — the Passion Narratives and Revelation. The history of the church provides a vast selection of men and women who have suffered for their faith, or who have borne suffering patiently and bravely for the sake of Christ. The climax of the study could well be the production together of a sermon or series of sermons for use either at that time or later in the ministry of the students.

Such is an example of a period of teaching that might be described as general, thematic and integrated. Obviously there are many such themes that could be treated in this way; and so the preparation of a curriculum demands rigid exclusion of many interesting topics, in an attempt to cover the widest and most typical areas of life to which theological judgement must be applied. In other words one should study a microcosm of the whole of life.

(*b*) *The Themes studied in the Course.*

The themes for study chosen by the staff of Rarongo with assistance were as follows:—

1st Five Month Session. General Introduction, including 'How to study', 'What is anthropology?', 'What is meant by the Inspiration of the Bible?', 'What is the Church?', 'How do we pray?', 'What is Theology?', 'What is a minister?', etc.

2nd Five Month Session. Themes Group I. *The Relation Between Christian and Traditional Melanesian Thought*.

Cargo Cults (5) leading to
God
The World
Man
Sin
Suffering
Spirits
Death

Within this scheme there is room for any other themes that a group of students wishes to develop. If the fuller treatment of some leads to the exclusion of some others, the staff is not worried.

The educational principles and techniques behind the treatment should have become familiar; and the students should be both willing and able to pursue other themes in their ministries, either alone, or in company with other Christians or non-Christians.

3rd Five Month Session. Themes II. *The Christian in Society.*

Home and Family Life
Leadership at the local level
Why political parties?
The Christian's responsibilities in society
Must the Christian always obey the state?
Should a Christian stand for the House of Assembly?
"Church or Local Government?"

(All these issues may seem to many Christians in developed countries to be settled and obvious. This is far from the case in developing countries and they have often led to bitter arguments and divisions.)

4th Five Month Session. Themes III. *What is the Church?*

Why the Church?
How should the church be governed?
What is worship and how shall it be made relevant?
The sacraments
The ministry of the church
The role of the layman within the church
The church as a teaching and caring community
The church as the body of Christ in the world
The ecumenical movement.

Each of these general themes can obviously be treated in the same sort of way as Suffering, outlined above, though variety of presentation and development is of course sought. It would be possible to choose many other general themes and also other specific topics under the general headings. Though, as will be argued later, there is a minimum of information necessary for all theological students, it is in fact likely that no group of lecturers will use exactly the same basic material; and it is equally likely that no group of students will want to pursue exactly the same questions. Thus the outline syllabus is open-ended and student-centred. When the system was begun there was a hope that each course be led by at least two lecturers, thus feeding in a diversity of theological scholarship. That hope is only now being realised.

Such are the first two years of formal theological education at Rarongo. Those who have shared in the course have found that it opens up exciting possibilities of development. But after two years at a theological college, the church has felt that it is time for a man to go back into a church situation, as assistant minister or chaplain. He can then discover whether the principles learnt at college can be applied in real life. A year of internship splits the college course. After this year the ministerial students return for two more years at college. First they must take a close look at the past three years, pinpointing the failures of the course and of their own work. Then they go on to more traditional education in the theological disciplines, repairing some of the gaps of the first two years, pursuing former interests and branching out into new studies.

There is plenty of opportunity for specialisation, in chaplaincy work, Christian education, translation, home and family counselling, Biblical languages and drama. With this general training it is hoped that these men — and occasionally women — will go out into their ministries equipped to serve people in all their actual needs.

(c) Other Relevant Factors.

No summary of the Rarongo course would be complete without a mention of some other facts.

It is the policy of the United Church that as much training as possible shall be given to the wives of the students. This inevitably leads to a division into English and Pidgin classes, since the standard of education of the wives varies from four years of high school or more to almost no formal education at all. One deaconess is set aside for the work, a full-time member of staff, who depending on her qualifications will also share in the teaching of the men. The church believes that the wife must be able to support her husband in every aspect of his ministry.

The first two years of the course are open to men or women who do not intend to proceed to ordination. They could take it out of pure interest, since the church has said that 'theological education is the education of the whole church to fulfil its ministry in the world'. Or they can plan to take (or they may have already taken) a certificate in education and thus be equipped for specialisation as R.E. teachers. In the admission of laymen Rarongo seems unique in P.N.G., though "in the 400 theological schools in Asia, Africa and Latin America on the lists of the Theological Education Fund, 33% of the students have no intention at the time they enter of proceeding to the professional ministry: 56% of the schools are carrying on some form of theological education for the laity".

The full course is open to women; for the United Church has accepted the principle of the ordination of women.

The geographical area covered by the United Church is Papua New Guinea and the Solomon Islands, which thus already transcends national barriers — and incidentally raises administrative problems in moving students from the British Solomons into Australian Territory and back again. But students come to Rarongo from beyond the area covered by the United Church. The Presbyterian Church of the New Hebrides, a condominium of France and Great Britain, sends its ministerial candidates to Rarongo; and the church of the Marshalls and Carolines provides the only American citizens in the student body. Thus the college can justly claim to be international.

Malmaluan Training Centre, which offers a wide variety of training, mainly for those who will not be ordained, is only eleven miles away and Gaulim Teachers' College 27 miles. They are both sister institutions of the United Church. Were all three on the same campus — as had once been hoped — much more could be done together; but exchanges of students and staff still add impetus to the life of the colleges and the church, and encourage happy relationships between full-time church workers whether ordained or not. Another result of having these neighbours should be that the Rarongo staff should be kept awake to developments in the educational fields.

Vudal Agricultural College and Vanukanau Roman Catholic Teachers' College are local sporting rivals.

Many of the students now come straight from high school:

They are therefore often in their teens and the proportion of single men is quite high. This is very different from even five years ago, when experience, maturity and proof of being a good husband and father were at a premium in the eyes of the candidates' committees.

(*d*) *The Advantages of the Rarongo Approach.*

We must now ask whether the themal approach outlined above fulfils the kinds of hopes that have been raised for it. The teaching starts from Melanesian thought and claims to deal with the problems that are met in Melanesia to-day. It should therefore be relevant to the needs of the students themselves and the people to whom they will minister. Irrelevance has been one of the stock charges brought against traditional ministerial training in both developed and developing countries. For the same reason the course should avoid the danger of deculturation. Many expatriates and indigenes have been worried that especially in its theological colleges the church seems to have taken men away from their own culture and made them half-European.

There is of course a real sense in which the Gospel is against all cultures; for the claims of full obedience to Christ will always mean that disciples have to transcend the accepted ideas of their own day and place. The danger in the past has been that people of all races have misinterpreted this deep truth. It has been thought that Melanesian — and African — Christians have to break away from Melanesian culture and identify themselves with European ways of thought and action. These are theologically neutral or they can be even anti-Biblical, as in the European obsession with wealth and comfort and its general materialism. The Rarongo course aims to take the cultural background of the students very seriously indeed and to show its relationships with the Biblical culture. In fact during the early part of the course many young people learn much about their traditional way of life that had lain dormant or half-forgotten. Having assessed their own culture they should be better able to see the Biblical demands upon it.

Trained to apply Biblical and theological resource material universally, a student should have the tools with which to examine any problem that comes his way, whether it be theological, moral, pastoral or social. It is a training in method and technique as much as in facts.

A graduate of Rarongo should have an integrated view of the theological disciplines. It is remarkable how this idea of integration keeps reappearing in almost every discussion on the renewal of ministerial training from every denominational point of view — an interest which perhaps justifies the length of this chapter in comparison with the others. That Roman Catholics appreciate the need for integration seems clear from the section in Keller and Armstrong devoted to 'ways of achieving convergence'. "The theological formation of seminarians, which for historical reasons has deteriorated, needs to be refashioned so at to unify the efforts of all the teachers and direct them towards a new and more complete integration of the theological curriculum". The need is expressed both to break down the fragmentation of courses and to integrate theological study and spiritual development. A Swedish Lutheran writes: "African students are most concerned to discover some common denominator, some universal rationale by which the diversity of various subjects can be integrated, a principle by which organic unity can be achieved in the whole body of knowledge with which they are confronted". A Rarongo graduate should have the materials with which to build this integrated house of learning. He should see, for example, how the doctrine of the Body of Christ is related to the church and to the institution of the Lord's Supper and how both are normative for the ministration of the sacraments in the light of the history of the church.

Of four types of learning in schools, Professor Kerr says "The four groupings of disciplines would furnish a framework for a planned programme of general education which would give the child adequate experience of all the ways of knowing and doing. It might also avoid inefficient repetition of a limited range of kinds of experience." Rarongo's hope is that it gives just such a planned programme of general theological education.

The first two years of the course are centred more upon the students than upon subjects. This has at least two direct advantages. It means that if there is a topical subject of urgent contemporary interest not noted on the course-outlines, it is still possible to spend weeks studying that subject, instead of what is in the outline. For any theme could have value in stretching the minds of the students — and the staff — and in practising the method. Such flexibility is specially opportune in Papua New Guinea when the whole social and political climate can change in weeks and when burning issues of yesterday can become moribund today. The other advantage is that every student can proceed at his own pace. A bright student who can recall all the Biblical references about, for example, the Christian and the State can be given a far tougher assignment than one who must spend hours finding the basic texts. Naturally any good teacher grades his assignments according to the abilities of his pupils, whatever approach he may be using; but there seems to be a greater inbuilt freedom in the present Rarongo course.

Finally one may note the advantages for the staff in teaching by themes rather than subjects. They are always discovering fresh facets of Melanesian belief and culture and so broadening their understanding of the students' backgrounds. This is true even for indigenous staff, since there is such great diversity in the cultural backgrounds of the different tribes. The staff is constantly forced to make its teaching relevant to at least one representative section of the population. And academically they are kept on their toes.

(*e*) *The Disadvantages of the Rarongo Approach.*

Professor Hirst has made a searching criticism of teaching by topics. He is writing about schools in England, rather than colleges in developing countries, but mutatis mutandis his criticisms are relevant. He argues that few teachers have the inter-disciplinary knowledge to do this effectively; and that before it is possible to have a bird's eye view of a topic many facts in each discipline must be learnt by the student. Thus the criticism affects both staff and students.

It is certainly impossible for a theological teacher to keep abreast of all developments in all theological disciplines — specially so in the Tropics where in practice in most missionary situations time for reading and research is often limited by the calls of administration. Therefore it was hoped that each theme would be treated by at least two members of staff, each bringing resource-material from his own specialist area. For one alone to attempt it is hubris. Here however one must make what must appear a racialist and paternalistic distinction. It happens that most expatriate teachers of theology in Papua New Guinea and other developing countries had some tertiary education in other disciplines before taking up theology; and that they then experienced a fairly broadly-based inter-disciplinary theology before specialising. The greatest problem will be when indigenes take over an inter-disciplinary course. For a few years there will inevitably be men with a somewhat less synoptic view of theology than their expatriate predecessors. Therefore if the church is aiming at an almost entirely indigenous staff by the end of the decade, then teaching by themes may be a little premature.

Hirst's other objection concerned student knowledge. There are certain basic facts without the knowledge of which a man could not be said to be theologically literate, just as a man who does not know Twelfth Night and Hamlet is illiterate in English literature. Some unpublished reports about theological education have emphasised that "we cannot do away with a basic stratum of factual material, because the foundation of the Christian Faith rests on facts" — in spite, one may add, of Bultmann's popularisation of Luther's and Paul's *Sola Fide*. For this reason the first term and the last two years of the course are devoted more to the teaching of subjects. But even during the thematic teaching it is surprising how much knowledge of a subject men acquire by the back door, provided that the back door is their own back door and that they are interested in opening and closing it themselves. The official visitors from the Association of Theological Schools had read the literature about the Rarongo course: they came sharing Hirst's reservations, but went away surprised at the grasp shown by the students of the essential biblical and theological facts.

Another danger is that interest in certain areas of theological knowledge will mean that other equally important areas will be ignored. The themes treated in each course must be constantly under review by the whole staff, so that each member can ensure that the broad areas of his specialisation are satisfactorily covered.

Many Melanesian students like text-books. Concerning both the Church and the Christian in Society there is no shortage of literature; but the first five-month session is on the relation between Christian and traditional Melanesian belief; and on that very little has been written. The students are thrown in at the deep end and it is not surprising that some flounder. It is easy to adopt a superior attitude, emphasising the value of personal initiative, but the shortage of text-books about some themes must be raised as a real problem concerning some thematic teaching.

So much for some educational disadvantages; but every course must be looked at in its own particular historical and geographical setting. We have already commented on the totally inadequate staff-student ratio at Rarongo in 1971, though it was educationally an exciting if exhausting year. The system needs a ratio of at least one to twelve, which has now, 1972, been achieved. The course also needs a good college library; and though there has been a reasonable supply of books, there has not been enough room for corporate or private study. But another serious question that must be asked is whether Rabaul will become a back-water: for a course like this ought to be followed near a thriving centre of social activity. Rabaul has a volcano that might obliterate it at any time; it is in an earthquake zone and in July 1971 it suffered two of the world's most severe earthquakes of that year: and 1972 has also seen severe earthquakes in Rabaul. There are moreover land-problems with the Tolai people, who are claiming the Gazelle Peninsula for the Tolais. So the days of Rarongo might be numbered.

To conclude, there is an approach here which is fresh and relevant, giving staff and students a comprehensive view of ministry and perhaps laying the foundations for an indigenous theology. There are obvious dangers in it; but it might well be worth pursuing in other parts of the developing — and developed — world.

(c) Some questions about Theological Curricula.

The foregoing chapters clearly indicate that much pioneering work has been done over the past few years in improving theological education in

Papua New Guinea. The progress has been influenced by educational theory from many countries; and there has been much co-operative inspiration, as with teachers' groups and centres elsewhere. But there still remain some questions to be asked about all this effort, from the specific point of view of curriculum theory. Criticism cannot be applied in so clear-cut a way as in other educational fields, as the difficulties in making suggestions for united curriculum development. Next, two statements will be quoted of modern curriculum theories at work. Finally will come a critique of theological curricula in Papua New Guinea in the form of questions that need to be asked. This will be done not from the stance of a judge, but as one enquiring ministerial trainer among his brothers.

(a) The difficulty in attempting a single assessment and critique of the variety of colleges represented in M.A.T.S.

It is not easy to make general comments about the whole collection of colleges. Here are some of the reasons for this problem: The objectives of the sending churches are by no means identical. Some seem to be training managers for District Offices, others, priests who will say mass, hear confession and attend to all the pastoral needs of the flock, others, preachers and evangelists for a mainly itinerant ministry, some teachers of congregations, others, overseers to care for huge areas and yet others, scholars who, they hope, will be on an equality with scholars in other disciplines and in other lands. It may be that some colleges are given by their churches a commission that covers all these objectives.

i. The members of some churches are suspicious of the development of rigorous thinking in its own right. Like some dogmatic politicians they fear the power of critical acumen. For there is a danger that their young men could break out from a narrow Presbyterianism, Biblicism, Romanism into a fuller understanding of Biblical and Catholic faith. There might be a danger of indifferentism or — red rag to some bulls — ecumenism. In the study of Religious Education being carried out mainly from Lancaster University the question is asked: "Is a truly 'open' approach really compatible with Christian education?" Most educationists however would put the development of the critical faculty high on their list of priorities.

ii. The entry standards to the colleges are not identical either educationally or spiritually. Thus there is an obvious difference from the uniformity found in most primary and secondary schools and universities. There is also considerable variety in the age and experience of students, a variety that can be extremely fertile, but can complicate the production of curricula.

iii. There is great diversity of student cultural background, at least as great as in multi-racial schools in Birmingham.

iv. Not all staff are of equal academic ability; and the church cannot command the brightest academics, as can many universities and colleges elsewhere.

v. Like lecturers in places of tertiary education the world over, not all the staff have professional qualifications in the field of education.

Nor do they come from the same sort of academic background, being from New Zealand, the U.S.A., Australia, England and Germany. Nor do they all have long experience in the country — and only a few are indigenous.

vi. It is uncertain whether in practice any church will regard the programme of the seminary as terminal, or whether they will be willing to pay for refresher courses and release their best men for such courses.

vii. The education offered at these colleges is many-sided, being both 'liberal' and 'utilitarian' at once; and in this they are unlike many other places of learning. They are aiming at the development of persons, thinkers and specialist workers at the same time.

viii. C. E. Beeby, with his distilled wisdom and common sense, might well argue that it is impossible to reach the heights envisaged in so short a time; and that in fact there is a mixture of all sorts of levels in all the colleges at once, thus making uniform progress and assessment almost impossible.

So in relation to general purposes, sending bodies, students and staff there is great diversity. Yet, in spite of the difficulty, it is proposed to make some criticisms in the light of modern curriculum theory. In order to have some frame of reference, we shall first quote two curricular prescriptions, one designed for primary schools in developing countries the other for universities in Australia.

(b) Pertinent aspects of curriculum theory.

An important part of modern curriculum theory is the study of objectives, knowledge content, learning experiences and evaluation and their interrelationships. Beevers has applied this theory to the situation of primary schools in P.N.G. and comes out with the following suggestions for a timetable for curriculum change:

i. The recognition of the need for change.
ii. The analysis of the existing system, to ascertain the stage of development already reached.
iii. A study of the problems and needs of the particular society.
iv. A study of the characteristics and needs of that society's children.
v. An analysis of the economy to delineate what resources are available for education.
vi. The formulation of overall goals for education with reference to national goals and the value system operative in that society.
vii. Major policy decisions to help decide how these goals find fulfilment.
viii. The formulation of precise operational objectives for each stage of education.
ix. The selection of appropriate subject matter psychological approach learning activities for the most efficient change in the curriculum at each stage.
x. Planning units of study and detailed curriculum guides.
xi. Planning and instituting an evaluation process for use during preparation, during use and at completion of use of the new curriculum.

If we change the word 'society' to 'church and society' and 'children' to 'theological students', we have a workable suggestion about curriculum development in theological colleges in P.N.G. It is suggested that on some of these tests, the colleges and churches score quite highly. There is a publicly recognised need for change: the Churches have studied the problems and needs of their societies; and they have given considerable thought to the most rational financing of their theological education. The colleges do try to study all the needs of their students, to do with the extended family and with education. The enquiry is engaged in finding out the answers to number viii, the formulation of precise and agreed operational objectives. The critique from a curriculum angle follows, but we may anticipate by remarking that it seems that the greatest failures have been in x, the provision of curriculum guides, in xi regular and organised evaluation at every stage; and that some churches have not been specific enough in their formulation and statement of viii, precise operational objectives.

Beevers is concerned with general policy. Falk and Dow are concerned with the actual working out of the policy in relation to university teaching. Their criteria are as follows:—

1. *The objectives of the course must*
   - (a) reflect a full knowledge of the discipline;
   - (b) reach the standard required to contribute to the specified degree;
   - (c) specify clearly the norms, knowledge and skills to be acquired;
   - (d) be appropriate to the previous knowledge and academic development of the students;
   - (e) be attainable by the students within the constraints of available time and the facilities which are provided.
2. The *methods* of presenting knowledge require:—
   - (a) choice of economical and efficient means for learning, whether by lectures, teaching in carrels, programmed instruction, etc.;
   - (b) other learning situations which have been devised (whether in laboratories, by presentation or essays or class papers, etc.). To give the opportunities for understanding of norms and for the cultivation of skills that are objectives of the course;
   - (c) testing and examining procedures which are both valid and reliable checks of the whole range of course objectives. Such procedures should test the stated objectives and nothing else.
3. The teacher must communicate his interest and enthusiasm in the discipline and show a concern that individual students come to share it.

Set out diagrammatically it would seem that Beevers and Falk and Dow are saying the same sort of things as Kerr, with different sub-headings in each box. A model for curriculum theory for theological training in Papua New Guinea is set out below.

It may be noted that the objectives of all the colleges have been revised during the last ten years. The graduates are now different products from their predecessors, for example in their conception of the role of the pastor, in their ecumenical attitudes and in their general academic competence. The *knowledge*-content is similar in the sense that men are still learning about the Bible, church-history and theology, but many changes have been made in what is taught about these; and many other subjects have been added, including anthropology, sociology, Greek, ecumenical studies and comparative religion. There is greater breadth to the *learning experience,* with many more methods of learning and teaching than once were used, programmed learning, role-plays leading to discussion, listening to radio, language-laboratories, the use of varied art-forms, etc. Perhaps there has been less experiment and progress in the methods of *evaluation* than in any other part of the curriculum.

Against this background of curriculum theory, we now ask some critical questions about the progress of theological education in Papua New Guinea.

(*c*) *Critical questions*

The churches and colleges have been looking at their theological education with critical eyes. The consultation in Fiji in 1961, one of whose visible results was the foundation of the degree-awarding Pacific Theological College, forced all the churches to ask what was being done and what ought to be done.

The consultation at Lae in 1968 highlighted many inadequacies and the meetings at Bomana in 1969 and Rarongo in 1971 have opened further doors. The foregoing pages have attempted to indicate the enormous strides already taken. Obviously nobody would want to pull down completely the imposing structure that has been built in Papua New Guinea. But there are still inadequacies in theological education Fund through M.A.T.S. The following criticisms arise from a study of curriculum theory: they are put in the form of questions, grouped under the headings of staff, students, culture and curriculum.

i. Are the churches yet convinced that theological educators should be qualified in educational theory and practice as well as in theology? The study from which this thesis arose was inspired by the writer's personal conviction that for him good will, experience and common sense were inadequate at this stage in the country's development. Perhaps not all teachers of theology understand or put into practice basic educational principles. It is interesting and perhaps relevant that some university lecturers in Europe have recently undergone crash-courses in educational theory and practice. One may also note that at the M.A.T.S. students' meeting in September 1971 there was discussion about staff qualifications in teacher training.

ii. Are all the staff currently involved in the life of the people of P.N.G.? The question needs to be asked of all staff, including the Roman Catholics and the Lutherans, even though most of them have been living in the country for a long time and speak at least two of its languages. Unless there is current involvement at a fairly deep level, there are likely to be gaps in the teaching.

iii. There are many highly qualified expatriate academics on the staffs of the colleges, probably more than anywhere else in P.N.G. except at the university in Port Moresby and the Higher Institute of Technology in Lae. But there is a generally, though not universally, expressed desire for mainly indigenous faculties by the end of the decade. Indigenous scholars are likely at first to have a less broad education background than their expatriate colleagues. The question presents itself whether this comparative lack of experience and breadth should affect the development of the curriculum?

iv. Is there currently sufficient evaluation of the teaching skills of the lecturers? Are their methods under regular review by the students, by their colleagues and by outside educational experts? In 1970 the students at Rarongo and in 1971 those at H.S.R.S. were asked to — and did — evaluate the teaching of the staff — to the pain of certain teachers.

v. Is there adequate insurance that at every stage students can understand the language of instruction? It has already been noted that both H.S.R.S. and Martin Luther Seminary have invested in fairly expensive English-language teaching equipment; and at Banz there is an intensive first-year course aimed to help the students to understand both spoken and written English. But the suspicion remains, since some of the brightest students still find the language of some lecturers beyond their ken. (Research is currently being carried out in England among the children of native English-speaking parents with smaller incomes. There is a real difference between the language which the children hear at home and in class at school; and it is suspected that there is a real lack of communication, causing slowness in some pupils from such homes.) The problem of comprehension is of course allied to that of the supply of suitable textbooks.

vi. Do the colleges attempt to ensure that at every stage of his progress the student is aware of what he is doing and why he is doing it? The rationale of much military policy towards 'other ranks' right through to the world war could have been summed up in the jingle:

Yours is not to question why
Yours is but to do and die.

And there seems to be little reason to doubt that it was a successful policy. But I do not think that such a policy would succeed today among the conscripts in the armies of the democracies. Perhaps too there would be a greater advance in theological education in developing countries — and elsewhere — if there were a more clearly spelled out policy of student involvement in college administration and curriculum planning. After all, students in Papua New Guinea have heard of student strikes and demands for a share in university administration all over the world. (Some theological colleges in Africa have been forced to lie dormant because of student unrest.) There is not a student observer in the M.A.T.S. executive committee; but the students are wanting a participant with full voting rights.

Have the colleges provided themselves with enough public guides to what is happening at every stage in the life of the college? It is not only students, but staff and other interested outside bodies who wish to look back and forward and see how current activities fit into an overall pattern. (Because of transport difficulties only a tiny proportion of church members in any communion in P.N.G. would be able to attend a college Open Day. And sometimes there is a touching sense of almost numinous awe when church members, in the vicinity for other reasons, are able to visit the college.)

vii. Has theological education taken seriously enough the society and the church of its students? Much can of course be learnt from the past; and every college now has some anthropology on the timetable. But the society is changing rapidly. The new elite obviously needs attention; but is there sufficient preparation in the colleges for those who will minister to the non-elite, to those who will not go on to high schools and universities and to those who will have never had any education at all?

The country is moving at such a rate that the churches must move quickly; but on the other hand, do buildings that cost half a million dollars fit in with the culture of the people — at least in regard to their theological colleges? (The fact that the church should build and own big blocks of flats and offices in the towns has not raised eye-brows. They are regarded as a good investment, expatriate-oriented magical money-spinners; and anyway the inhabitants are often expatriates. But a theological college?)

The remaining questions concern evaluation and assessment, of students, of the methods and content of teaching, of the learning activities and the whole life of the college. The basic question is whether any college has looked at all sides of its development in the light of modern educational theory? Has its view of curriculum been as large as Herrick and Tyler suggest: "All the learning which is planned and guided by the school, whether it is carried on in groups or individually, inside or outside the school!"?

viii. Have the learning activities been under constant review in the light of all modern methods of teaching? Or are there places where chalk and talk are still all that the students normally meet (except when visitors are expected)? Present students still rebel against newer methods, though they object to reverting to the old when they have experienced the new. Future students will have seen newer methods in their primary and secondary schools and will wonder what the reason is if the college does not use some at least of these methods.

ix. Have the colleges worked out the relationship between the knowledge-content of the courses and the attitudes are to be inspired? Is the knowledge-content adequate; and is it under almost annual review, so that the students are given what is needed in the 1970's, rather than what was needed in the 1960's.

x. Are the methods of student-assessment in line with the best, though not necessarily the most modern, that educationalists have devised? Are the colleges experimenting with their examination and assessment system; and above all are these systems planned so at to organise success, rather than failure?

xi. Are the learning experiences in the college developmental, rather than static? "It is necessary to plot a developmental sequence of cumulative growth both in power and in content, in order to determine whether the subsequent contexts merely yield new information while requiring the same powers of comprehension and the same level of thinking, or whether there is an increment in both."

xii. "Care must be taken that in specifying objectives for different ability levels. The teacher is not setting expectancy levels for the less able which may turn out to be self-fulfilling prophecies." It must be asked whether this care has always been taken, since, especially in developing countries, it is easy to underestimate the potential of some students. They may come from an area with traditionally little primary education, or be the first people from their village ever to receive tertiary education. But enthusiasm often more than compensates for the lack of background; and some of the most unlikely students can reach stardom.

These dozen questions are worth asking. No one wants to produce neurosis in the staff of the theological colleges. Perhaps it would be better that they should stay where they are, resting on their laurels and consolidating for a year or two, since so many innovations have been urged by them upon the churches and been accepted. But curriculum development is an ongoing science and for its successful pursuit regular assessment and evaluation are essential.

SELECTING AND TRAINING PAPUA NEW GUINEAN EDUCATIONAL ADMINISTRATORS

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The Interdependence of Bureaucratic Process, Firmness of Government Purpose and Social Climate

I have been asked to present this paper as a record of more than a decade of activities of the Education Department's localisation programme. In doing so I will refer frequently to detailed papers by those who have been directly and fully involved in initiating and developing phases of the programme and writing up reports on what has been done. I do not claim responsibility for the initiatives. However, as an official who has been closely involved in the administration of the programme, I shall attempt to present an overview, with a description of the general features of the programme, its outcomes and its problems. In doing so I would like to describe how the dysfunction between, on the one hand, the necessarily slow and gradual bureaucratic processes of staff selection and training and, on the other, the categorical nature of a political decision resolving a major social dilemma (such as Gorton's decision to decolonise in May 1970), places severe limits on rational administrative planning.

The effective implementation of politically chosen goals (by a responsive bureaucracy) is a key factor in the efficacy, and therefore the reality, of political power. On the other hand, the efficiency, and therefore the overall effectiveness of the bureaucracy, is equally dependent on clarity of political goals.

In the sixties the Department's localisation programme was seriously impeded by confusion over political goals arising out of a colonial and Australian climate that was largely unconcerned over the immediate future of Papua New Guinea (or at least unwilling to make any clear commitment). When a clear commitment to early self-government was made, the firmness of political purpose and the urgency of social demands have created pressures for a rate of localisation training and placement far beyond the capacity of the bureaucracy to cope effectively.

For several years, education department initiators of localisation action were being frustrated by their inability to get public service authorities to take any decisive action on creating appropriate positions — for advancing potential Papua New Guinean executives. Now, public service attempts to localise at a reasonable level of efficiency are being frustrated by a social and political climate, and related expatriate staff retention problems, which undermine plans for phased transfer.

After discussing the administrative history of the Education Department's localisation programme, I would like to draw out some implications for the future concerning the inter-relationship of social climate, political commitment, and bureaucratic process for the evolution of a functional school system for an independent Papua New Guinea.

A. A DESCRIPTION OF THE LOCALISATION PROGRAMME

1. The Process

The process is described as it has now evolved. The history of its evolution is outlined later in the paper.

Daloz (1971) has described the *executive development scheme* largely as it now operates in the education system. Essentially it is a process through which potential executives are provisionally identified and then screened through a series of lists for training and try-out as junior (head teacher level), middle-level (inspector level), and senior (District Superintendent level and above) Executives. Identification and screening is on the basis of systematic use of reports of performance at Executive Assessment Workshops, in the field, in training courses and at seminars. Throughout the programme selected candidates are tried out by being given acting appointments at levels for which they appear to have potential, then confirmed and/or advanced or returned to a lower level, depending on performance. This process attempts to avoid the lasting consequences of "the Peter principle" by finding out, by means of a short-term acting appointment, when an officer has reached his "level of inefficiency" and, where this is so, returning him to his former, lower, level.

In giving only a brief summary description in this paper, I would not want to leave the impression that the development of the programme was a simple exercise. Indeed, over a ten year period a great deal of work and skill has gone into the development of the scheme.

Gibson (1968) refers to the tendency under the old regime to select dependent compliant Papua New Guineans for advancement in the Public Service where what is required for an independent Public Service is persons capable of independent and functional decision-making. Throughout the programme, certainly up to the present (possibly increasingly in the future), administrators of the programme face the problem of conflict between those who wish to give advancement opportunities to the compliant, loyal, obedient public servant and those who wish to identify the person capable of thinking for himself and acting for himself, even if this does lead to conflict with his superiors.

Hicks (1970) and Daloz (1971) described the initial development of the *Executive Assessment Workshops*, perhaps the key piece of bureaucratic machinery in finding suitable persons for trial as executives. Workshops consist of three or four days of intensive activity, usually for three groups of seven candidates, each group under observation from three assessors. Activities include psychological and general written tests, and considerable interaction in leaderless groups.

Mulford (1973a) reports research into the internal efficiency of the workshops, indicating a high degree of inter-assessor agreement, the importance of having a suitably experienced psychologist in each assessment group and the possibility (realised in practice) of reducing the length of the workshops from five days to 3½ days. Mulford (1973b) later compared the performance, on Lahara session unit courses at the University of Papua New Guinea for the 1972/73 vacation, of candidates ranked high (6), middle

(9) and low (3) on the executive assessments workshops, and those candidates who had not been assessed on workshops (81). Difference in University course performance between candidates categorized as having high and low workshops performance was significant beyond the .01 level, while the difference in performance between those ranked high on the workshops and those who had not been to workshops was significant beyond the .02 level. Similar results are available from the performance data at the University of Papua New Guinea for the year ending 1973 of candidates selected by the workshops as having executive potential. During a week-long inspectors' seminar in 1973 the performance of Papua New Guinean inspectors selected by workshops was compared by three senior departmental officers who were not aware of their workshop performance. Seminar performance correlated with workshop ranks. When the field performance of 28 associate, acting or substantive District Superintendents was independently assessed by senior departmental officers, the performance of those with high workshop ratings (14) was compared with that of those with middle workshop ratings (8) or no data from workshops (6). The differences in performance were significant (in the expected direction) beyond the .001 level. Similar results were obtained with 40 trainee lecturers at Teachers' Colleges.

One of the quite serious problems with the executive assessment workshops is the high cost of mounting a workshop when account is taken of the cost of salaries for senior level assessors and for the candidates, the cost of transport to a central point for three assessors and seven candidates per group, and related costs of accommodation for four or five nights. To put this in cash terms, the average workshop involves three assessment groups (9 assessors and 21 candidates) and costs $2,500 (excluding salary). During the 1973 year fifteen workshops were held. The proportion of officers identified with executive potential approximates four out of ten.

Mulford (1973c) describes attempts to develop *pre-selection procedures* that would increase the effectiveness of workshops and therefore reduce the number of workshops required and the costs entailed. Initially it was intended to do this by a pencil and paper test (the WM questionnaire) comprising items designed to scale attitudes to bureaucracy, sense of political efficacy, open and closed mindedness, flexibility, task/person orientation, etc. It was found necessary to supplement the written test with an oral interview by a senior localisation officer on an open-ended case study. Actual performance on workshops of 54 candidates, previously assessed by the pre-selection procedures, indicated that of those pre-selected as likely to have executive potential, 60% were assessed as having potential (as opposed to only 40% where candidates had not been screened by the pre-selection procedure).

As selection procedures have developed, the flow of potential executives has increased. Moreover, with the passing of time the executive development scheme has yielded candidates with proven potential at progressively higher levels, so that the training programme has had to diversify considerably. From fifteen officers attending a first "senior officers course" in 1963 (Gibson, 1968) to 20 officers attending headmasters' courses (for training as primary school headmasters) in 1968, the scheme has developed (1973) to a total of 340 full-year* training places (over and above teachers' salaries provided to staff schools). Of these, 39 were for associates (supernumerary staff in training) to Teachers' College lecturers and to executives in Teachers' Colleges, in district education offices and at headquarters. Forty were for university places, including free-place and diploma courses, seven for the Public Service Higher Certificate, 31 for courses in Australia, and eleven for courses overseas. The remaining 220 places were for headmasters and Form 3 equivalent courses, including a small number (20) for training of technical college staff, vocational centre instructors and manual arts teachers. In 1974 the lower level courses (headmaster and Form 3 equivalent) will shrink to 140 to enable a complementary growth in the higher level courses (total full-year places available — 360). Of the 140 lower level places, only 65 will be for training and qualifying primary school headmasters. One of the replacement courses is an "Educational Leadership" course, to train generalist executives for middle level executive positions in various divisions of the education system. A growing number of courses, too, is for pedagogical rather than executive training.

2. The Key Role of the Bureaucracy

It would not have been possible to achieve national localisation goals in any measure at all without the commitment, over a long period, of interested and able staff capable of devising functional bureaucratic machinery to achieve these ends.

In part, of course, the effectiveness of the localisation selection and training programme, once started, was a spin-off of features which were developed as part of the general education system but which did help in the selection and training of effective local decision-makers. One of these is the regular process of annual assessment reports on (and to) both teachers and senior executives — an important feature of departmental staffing and advancement policy with obvious implications for the selection and training of local executives. Another was the policy of largely open administrative decision-making which incorporated machinery deliberately set up for the sake of involving affected parties. This required routine reporting of progress and presentation of proposals for action. The executive had to be prepared to work out his proposals, present them, have them subject to challenge and debate, defend them and implement a final decision which took account of the consensus of the decision-making group. Examples would be the fortnightly departmental staff meeting, the annual week long senior officers conference of the department, the annual week long regional ratings conferences, meetings of the National Education Board and District Education Boards, meetings of governing bodies and other committees of institutions.

*In fact the number of trainees was considerably greater, as many of the courses were for six months or less.

Over and above these were special features of the education system which were developed for the purpose of implementing the localisation programme. Perhaps the most important of these was the Executive Development Committee, a weekly meeting of divisional representatives, chaired by the Deputy Director, which reviewed progress on localisation, made decisions to facilitate localisation across all divisions and supervised the implementation of these decisions. Necessary concomitants of this machinery were regular and detailed minutes recording decisions and identifying action officers responsible, and weekly reviews to ensure effective implementation of decisions. An inevitable spin-off of this process was that divisions that were initially disinterested in localisation became stimulated by reports of the activities and achievements of others and gradually became actively involved in the localisation process. Indeed, as the pressures for localisation increased and the worth of the selection process became demonstrated by its products, the executive development committee resembled at times a "head hunting" exercise, with divisions competing keenly for those identified as having high executive potential. Inducements held out by the divisions competing for talent took the form of attractive training programmes with high level target positions of the carrot.

Another important piece of machinery was the establishment and funding of a large number (see above) of supernumerary training positions over and above those required to operate the schools. Opportunities range from courses in Papua New Guinea and overseas to supernumerary associate appointments (for example, associate District Superintendent) and overseas travel. In effect, this meant calculating in advance for each financial year the number of staff likely to be available, determining a figure to meet in-service training needs, and planning expansion of the school system on the basis of the balance. This granted enormous flexibility in the posting and payment of trainees who could, quite independently of cumbersome and extremely restrictive public service promotional procedures, be posted as associates at appropriate levels, granted the full powers of the position, paid at an appropriate rate and left to demonstrate their ability, without running the risk of applying the "Peter principle". This would not have been possible, certainly not so easily, without the existence of the National Education Board and the Teaching Service Commission, and consequently the acceptance by the Treasury and the Public Service Board, with little question, of a precedent which it had been completely impossible to establish at an earlier stage of the programme's operations (Gibson, 1968).

It is realised that other Government departments, now anxious to localise, but lacking machinery of this kind with its associated flexibility, have been seriously hindered in their localisation programmes. However, lest they think that the provision of such machinery is sufficient, it is important to recognise that the Education Department's localisation programme would not have been possible without a very heavy and continued investment of skilled, able and well trained administrators. This investment, which was encouraged and developed by a succession of Directors of Education, for many years received no support from the Public Service Commission. That is to say, in reviewing the past ten years of the Education Department's localisation programme, it is important to recognise that throughout that period a total of six and never less (at any one time) than three persons who had or attained doctorates during the period took an active interest in the development of the programme, often in addition to their other commitments. Over and above this highly qualified group, the development and implementation of the programme was facilitated by the presence of a number of other persons who, while they may not have obtained doctorates, would be regarded by their trained colleagues as having the ability to attain such qualifications. In summary, the initiation, development and implementation of a sophisticated and eventually extensive programme required a substantial and continued input of able and trained persons.

B. OUTCOMES

One uncontested outcome is an improvement in efficiency of selection and training, confirmed by the eagerness with which senior Education Department personnel have been selected for high level posts in other departments. A related advantage has been the time available for try-out and testing in practice of the suitability of those selected, leading in general to far better placement than would otherwise have been possible. For example, there have been a number of notable cases where apparently able people have been appointed to senior executive positions on an acting basis and then, having demonstrated over a period of a year or more inability to cope with the position, have been withdrawn to other postings, allowing further try-outs until successful placement was effected.

A further satisfying outcome to those involved in the scheme has been the impressive level of confidence and competence displayed by seasoned products of the programme now occupying senior executive positions. For the average executive trainee this achievement has certainly extended considerably the psychological limits of what it was considered possible for a Papua New Guinean executive to achieve and the overall result has indeed surprised many who were involved in the early planning of the programme. I suppose it is a truism now but it would seem that the executive ability of the Papua New Guinean leaders was long underestimated.

There are still, of course, serious shortcomings and these have important implications for the planning of future training programmes. Given the fact that the rapidity of the localisation process has made it impossible to include more than one or two university graduates among those trained for senior executive positions in the system, it is hardly surprising that many of our senior executives have considerable difficulty in handling the abstractions that underlie bureaucratic procedures, educational and national planning exercises and other common features of sophisticated, modern, administrative machinery. Mulford and Young (1973) have summarised research evidence on cognitive studies in Papua New Guinea which indicates that the intellectual structures underlying contemporary western administrative machinery are culture-bound in a way that is foreign to Papua New Guinean thinking. It is, for example, a particularly difficult exercise for a Papua New Guinean administrator who has had little training in manipulating reality through symbols to project, say, enrolment trends, compare these with projected employment trends, and draw conclusions about the school leaver problem in 1979 which will have sufficient force and reality for him to take urgent and positive steps to re-shape the education system.

It is equally difficult for him to visualise the logical implications of bureaucratic discipline with its differentiation of roles, and prior consultation of all those whose role is involved in a particular decision-making area. Yet this realisation is necessary if he is to ensure that the flow of relevant information is maintained to those most directly involved, so maintaining the confidence of the bureaucracy's executives in its capacity to apply its specialised skills in a systematic way to the solving of the problems that it encounters. In both the foregoing situations the normal, untrained tendency is to handle problems on a "one-off" basis and to make decisions on the basis of immediate pressures rather than a weighted evaluation of immediate and long term consequences.

Bulmer (1971) warned of the danger of developing a western motivation of competitive individualism, yet there can be little doubt that competition for positions has been the major motivating force of the department's localisation programme. Promotion stresses competitive selection on the basis of relative performance, from classroom assessment through the executive assessment workshop to final selection for an ever narrowing number of positions as the executive moves higher up the ladder.

Localisation officer M. Joyce (personal communication) suggests that some candidates see this as competitive tribalism rather than individualism. Generally the commonly expressed wish of the Papua New Guinean student to "help my people" refers to the tribe rather than Papua New Guinea as a whole. Certainly, too, those who have achieved positions of national leadership in the education system still seek relaxation primarily among their fellow tribesmen. The fact is, there are serious grounds for concern by the average Papua New Guinean executive trainee over relative tribal success in the executive 'rat-race' in contemporary Papua New Guinea.

When the anxieties arising out of this situation are combined with a lack of the training in abstractions necessary to perceive an organisation as a system of interacting elements, then it is not surprising to find indigenous executives making decisions which are regarded as authoritarian.

Perhaps the most significant problem for long term stability of the local bureaucracy is the extreme inequity of the distribution of senior executive positions amongst districts. An analysis of 196 executives either in executive positions or in training at the beginning of 1973 indicated that the Central District, with 6% of the country's population, supplied 33% of those training for senior and middle level positions in the education system. Sixty-nine per cent came from six districts with only 19% of the country's population — not surprisingly those districts which had longest contact with the outside world (Central, East New Britain, Bougainville, New Ireland, Manus and West New Britain). At senior level (District Superintendent and above) the concentration was even greater with officers from those six districts occupying 91% of the positions localised. During 1973 deliberate steps were taken to involve in executive assessment workshops more officers from those districts which, due to a later start with education, had relatively few executive trainees. At the beginning of 1973 the four highlands districts, with 40% of the country's population, had six per cent of its executive trainees. An analysis at the end of 1973 of postings for 1974 indicated very little improvement in the position, to seven per cent.

When this fact is drawn to the attention of senior Papua New Guinean decision-makers (largely *ipso facto* officers from the districts of longer contact) the reaction tends to be remarkably similar to that of expatriate public servants at the commencement of the localisation programme. Use is made of such arguments as "Of course. What could you expect? They haven't got the education. Promotion must be by merit, not by political grounds. They'll have to wait until they can catch up in education." When the discrepancy* in the share of high schools is pointed to, there is resistance to any proposal to re-distribute educational opportunities of the expense of those districts which have got more than a head start.

One of the most serious problems is an outcome not of the localisation programme but of confusion over goals at the higher levels of bureaucracy, which, up to and for some time after the point where Gorton decided to de-colonise, slowed up the rate at which executive trainees were selected, placed and advanced, so that the Department has nowhere near sufficient suitable executives available for posting at the rate now demanded. Appointments to senior positions will soon have to be made with far less than the minimum of experience considered essential. Three years ago, McKinnon (1971) was seriously worried by the prospect that, given that an officer required two years in a position before he fully understood the requirements of the position and became professional in the discharge of those responsibilities, it might well be necessary to consider systematically skipping levels in a progression of two years each from level 3 to level 5 to level 7 to level 10 (Headquarters Superintendent). While a select few of the present executives have had these levels and amount of experience (for example, the present Director), a more typical case might be some of the current appointees to departmental headquarters. While these are able officers with considerable potential, they are short on senior experience at exercising responsibility. For example, in the period 1970-1974 (virtually since McKinnon expressed his concern), a number have moved from class teacher level to level 10 (Headquarters Superintendent). They are generally about seven years out of Teachers' College.

When, at independence, senior expatriate administrators exercise their option to leave the country, it is these headquarters associates who will largely replace them.

Another casualty of localisation practice has been the associate basis of training which, while it has worked in a few instances, by and large has not surmounted the difficulties of intercultural communication and confidence The associate scheme envisaged appointing a supernumerary Papua New Guinean alongside an expatriate incumbent, then gradually transferring responsibilities to the Papua New Guinean appointee as he became ready for it, with the expatriate retiring to a position of consultant, providing advice on request. The phasing of the actual transfer of powers has been an interesting paradigm of the localisation scheme as a whole. At the early stages of the programme few powers were transferred and the common complaint from the Papua New Guinean associate was that he had little real influence on decisions. When this was countered with an instruction from the Director to expatriates to hand over the powers rapidly and then act in a consultant role, a point was very quickly reached where most consultants complained that their advice was rarely sought. There can be little doubt that this experience will be a major factor in the rapid exodus of experienced expatriates once they have the option of going (at independence).

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* For example, in 1973 Central District and East New Britain, with 10% of the population between them, had 24.5% of the national share of Form IV places. The highlands districts, with 40% of the population, had 15.7% of the Form IV places.

In reality, of course, there are serious disagreements about the rate at which localisation can and should occur. A professional criterion would operate in terms of the rates indicated above by McKinnon. A political criterion, on the other hand, would require almost instantaneous localisation of some, if not all, positions. A cultural criterion, citing the inappropriateness of expatriate models for local trainees (for example, in tertiary institutions) would prefer to err in the direction of too rapid rather than too slow localisation, rejecting abstract and international "standards".

The historical reality, of course (i.e. the way in which a major social revolution actually takes place, on the political and social rather than the bureaucratic plane) means that the above considerations are rather academic. Rather than a smooth planned transition the Education Department's localisation programme has been more akin to the tempo of events preceding and following an eruption, slowly developing in response to unrecognised pressures, little happening for a long time, things seeming to go on as before, then everything happening at once.

C. HISTORICAL OVERVIEW

For relative newcomers to the scene, it often comes as a surprise to learn that the beginnings of the localisation programme date back fifteen years or more. Former Director of Education Johnson (1970) paid tribute to the Public Health Department as the first to initiate an executive selection and training programme for Papua New Guineans in the fifties. The first general steps by the colonial administration in this direction were the results of an administrative direction by Minister for Territories Hasluck in the early 1960's. In 1961 and 1962 Gibson had plans under way in the Education Department and by 1963 he had mounted the first Senior Officers Course in Port Moresby, operated by Walker.

The reason for surprise at these dates is no doubt due to the fact that for so much of the sixties the localisation programme had so little impact. For seven years the failure of the programme to expand rapidly was due to a failure by the Public Service Commission, and expatriate public servants, to accept the imperatives of localisation training and facilitate its implementation.

Questions concerning the desirable rate and method of localisation were and are largely academic. Whatever the intentions of bureaucratic planners who make it their concern, the actual rate of localisation is a function of changes in social climate arising out of political decisions. The present exodus of skilled expatriates is going to be very rapidly increased with independence and the option for senior experienced expatriates to go. The planners in the Education Department thought in terms of an ideal of gradual transfer of power. The reality was a long period of unsuccessful attempts to implement localisation up to the point where an unequivocal political decision on self-government was made by the colonial government. This was followed by an ever-increasing acceleration of the rate of localisation to a point where phased transfer is on the verge of breaking down. What we are experiencing is, of course, a well-known phenomenon of social change described in the case of the racial change in American suburban schooling as "tipping". That is to say, in school integration in the States one could observe in a white suburb with a largely white school enrolment, a gradual build up of Negro enrolment to a critical figure, perhaps 40%, then a sudden evacuation of whites and a rapid transformation of the school into a largely black school.

The phenomenon of "tipping" appears to fit the history of localisation in Papua New Guinea. One could even graph the progress of localisation of senior decision-making positions, say, District Superintendent and above in the Education Department. Taking account of acting appointments, for the 66 positions at level 9 and above in the education system (including nine Teachers' College Principals), the rate of localisation achieved between 1963 and 1968 was seven per cent (Gibson, 1968), by September 1972 was 21%, by February 1974 was 40%, and, taking account of announced intentions of senior expatriate officers to leave when they have the option, will have to be at least 60% by independence.

Former Director of Education Johnson (1970), reporting on the education scene from 1962 up to 1970, said one of his main tasks was convincing Papua New Guinean teachers that it was *their* Education Department, and not an Australian education department that employed some Papua New Guineans. The political tipping point was the Gorton decision to replace Barnes with Peacock, with all that entailed for a firm political decision to make Papua New Guinea self-governing (May, 1970). However, in terms of Public Service machinery to make localisation possible, it was towards the end of 1972. In terms of senior expatriate public service attitudes it was the date of acceptance of the Simpson recommendations on compensation (late 1972).

To fully savour the present rapid rate of localisation, it is necessary to consider it against a background of the rate of localisation prior to 1973. The problems of the sixties are well documented (Gibson 1968). A relatively recent example might illustrate the lag in adjustment of bureaucratic decision-making to political decisions. In late 1971 the Education Department proposed to the Public Service Board the establishment of a position of Assistant Director (Localisation) to facilitate the planning and implementation of localisation. The proposal was rejected at that stage, it being considered that the appointment of an officer at middle level (Level 7) would be sufficient for the task. Twelve months later, under political pressure, the Board had caught up with reality and created positions at approximately Assistant Director level in all departments to facilitate localisation processes.

In summary, the history of the "tipping" process in Education localisation has been:

(a) Eight years in the wilderness when some farsighted bureaucrats, attempting to anticipate an inevitable historical trend, developed machinery and a small pool of local executives. This did provide a useful base but the process was seriously inhibited by lack of understanding in other parts of the bureaucratic machinery, a lack of understanding which was largely attributable to ambiguity at political level about overall goals.

(b) A political decision (May, 1970, Gorton) to prepare Papua New Guinea for self-government.

(c) A time lag of over two years before the public service had made appropriate adjustments to recognise the implications of and implement the political decision (the time it took to gain acceptance of the Simpson Report and to set up basic machinery for the rapid advancement of local public servants).

(d) A rapid and largely unplanned implementation of localisation that most expatriate public servants found chaotic and intolerable, so making phased localisation training increasingly impracticable.

D. ADMINISTRATIVE LESSONS FOR THE FUTURE

The experience with implementation of localisation may have interesting implications for future administration of changes in education in Papua New Guinea. Take, for example, the nature of the education system in this country. At present the aspirations of the vast majority of parents lie in the direction of gaining for their children a conventional western education leading to employment. Political decision-makers are confused as to the issues and in this confusion tend to respond to immediate pressures in terms of granting the voters what they want.

A small but growing band of Papua New Guineans is beginning to sense the likely consequences of continuing with more of the present system. However, anything they do administratively to minimise the present traditionally western type education is likely to be frustrated by other sections of the public service, politicians and parents, all of whom reflect the current national confusion about educational goals and tend, therefore, to fall back on established practice. As the pressures generated by the dysfunctions of the present education system grow, the need for a radical re-shaping of the education system is likely to come forcefully to the attention of most political decision-makers. At that point the situation will "tip" and there will be a considerable political demand for bureaucratic machinery and personnel capable of implementing a more functional education system.*

Given hoped-for development of political decision-making about education along the lines indicated above, what is the best course of action for the minority of professionals already concerned with implementing a more functional system? Perhaps they could focus on research studies of the shortcomings of the present system, giving publicity to the alternative courses of action facing the country with a view to eventually gaining majority support for a more functional system. At the point where there is an urgent political demand for a more functional system, there is likely to be a shortage of teachers and educational administrators with ideas and experience to enable them to implement it effectively. In readiness for this demand, effort could therefore be put also directly into practical studies and experience at Universities and Teachers' Colleges, with a view to giving tomorrow's teachers ideas about and experience with alternative models of the educational process.

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*This is the best that can be hoped for. The country might well get something else, i.e., a system controlled by an elite which has a vested interest in an elitist system and endeavours to preserve it.

*In fact the number of trainees was considerably greater, as many of the courses were for six months or less.

*For example, in 1973 Central District and East New Britain, with 10% of the population between them, had 24.5% of the national share of Form IV places. The highlands districts, with 40% of the population, had 15.7% of the Form IV places.

*This is the best that can be hoped for. The country might well get something else, i.e., a system controlled by an elite which has a vested interest in an elitist system and endeavours to preserve it.

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"W. C. GROVES: HIS WORK AND INFLUENCE ON NATIVE EDUCATION ESPECIALLY IN PAPUA AND NEW GUINEA (1946-1958)"

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As a nation confronts any major crisis, it is well that its leaders look not only forwards but backwards. In doing so, they re-examine their "grass roots" foundation and become more fully aware of the trend of cultural evolution and of cultural and societal changes.

Thus, it is commendable that many of the ideas that William Charles Groves propounded are now accepted in the present education system of Papua New Guinea. Groves' ideas are generally more accepted today than they were during his directorship from 1946 to 1958.

This paper, based on research for a Master's Thesis, endeavours to set out Groves' philosophy of education that he formulated through his teaching experiences and his studies and training in social anthropology. The extent of his experiences embraced not only the Mandated Territory of New Guinea but also Nauru, the British Solomon Islands, the Northern Territory of Australia and the Territory of Papua and New Guinea with each providing thte training ground for the next experience.

Attention is drawn to his work in these areas and the extent to which Groves influenced development in native education. Groves was a rare hybrid—a teacher, educationist and anthropologist as well as an accomplished linguist.

His educational work in the Territory of New Guinea (1922-1925) made Groves realize that education should form an integral part of the child's society and culture. The content of the curriculum should be embedded in the social structure of the native society and in the values, beliefs, attitudes, behavioural patterns, *mores* and traditions of the native culture. A thorough knowledge of these social and cultural aspects are pre-requisites for the educationist formulating a curriculum for native students.

The education given to native students in the Administration schools of the Territory of New Guinea (1922-1925) was the Australian system with few adaptations. This super-imposed, alien education had little in common with the socialization given by the village societies from which the students came and to which, in those days, most returned. The Administration education was 'time out of life'. It was like trying 'to graft a daisy on to a pandanus'. It just didn't take!

This educational experience caused Groves to forsake teaching in order to study social anthropology,[1] which he hoped would present solutions to the questions raised and the problems posed. His study for his Diploma of Anthropology and his field work in New Guinea[2] laid the foundation of his philosophy of education. He became convinced that social contact with

Europeans changed the culture and society of the native inhabitants. This social and cultural contact could be neither halted nor contained. The age-old tribal education and socialization of the younger generation had to adapt and adjust to meet this onslaught.

Within the native villages, Groves met the misfits that the Australian education system had produced: they were alienated from their old way of life without gaining the basic knowledge and skills required to absorb this new culture shock and to refashion their society nearer to their newly awakened ideals and aspirations.

To Groves, education was something more than mere 'schooling': it was the total process of learning that over a period of years changed a helpless baby into a fully functional, mature and accepted adult member of the society in which he was born and within the confines of whose culture he must live out his life. Education involved not only the transmission of traditional cultures and its *mores* but also the inculcation of an attitude to change and the ability to use change to foster a more rapid evolution of the culture along the pre-determined lines of progress and advancement. On a torn scrap of paper, within the pages of an old black notebook in the W. C. Groves' Papers, Groves, with his characteristic abbreviations, wrote a quotation that sums up his concept of native education:

> "McMurray in *Peabody Journal of Education:* Education is the best development of children in harmony with the needs of society. We may therefore describe education as the process of adjustment to environment. The old fixed order of the world is passing away, we have change on every side."[3]

Groves' anthropological writings and his addresses to various societies show plainly the development of his thinking on this topic. Educationists could with profit devote more attention to these writings. The most readily available are those in *Oceania* and those contained within the W. C. Groves Papers held in the New Guinea section of the Library of the University of Papua and New Guinea.

Groves' book, *Native Education and Culture-Contact in New Guinea: A Scientific Approach*, (1936), was the outcome of these educational and anthropological experiences. This treatise sets out not only a masterful analysis of tribal education and socialization, but his own philosophy of education, his ideas concerning the structure and curricular content of a system of native education for those in contact with Western civilization.

A worthwhile project could well be the presentation of all his various reports, articles, papers and addresses on education and social anthropology and his treatise on native education within one book readily available for research workers, teachers, educationists and anthropologists.

In 1936 he was selected as a delegate to attend an international conference at Honolulu (Hawaii) organized by the Yale University in conjunction with the University of Hawaii with financial support from the Carnegie Corporation. The topic was "Native Education in Pacific Countries".[4] Groves' papers dealing with culture contact and its consequences for native education were widely acclaimed as a possible solution to the problem of native education especially in Pacific countries. Groves pointed out the devastation to the native cultures that often followed the culture contact of Melanesian cultures with Western civilization. Education should aim to teach the children to adjust to these changes which should be used to the betterment of the village society. In short, the education given should provide the student with the skills and knowledge necessary to accelerate the rate of evolution of that culture along the lines pre-determined within the culture and society itself.

Groves' next experience as Director of Education in Nauru (1937-1938)[5] afforded him the opportunity to test his scheme of education under almost laboratory type conditions: a small, isolated area, a numerically small society with its own culture, language, myths and legends. As there were few mission schools, Groves exercised control over the major parts of the education system. His particular task was to formulate a new curriculum suitable to and harmonious with the Nauruan culture. Perhaps his most worthwhile achievement in Nauru was the revitalization of the Nauruan Club — the Domaneab. Through this club, Groves endeavoured to give the Nauruan people pride in their own cultural background and confidence in their future as a society. Groves worked through the native chiefs. An indication of their acceptance of Groves was the willingness of the head chief, Detudamo, to lecture the Nauruan teachers on the Nauruan culture and society.

These Nauruan years are fully documented in the Groves Papers. Taken in conjunction with the Garsia Papers,[6] they are a treasure trove to research workers interested in this period.

Groves' next move was probably the outcome of his attendance as a delegate to the Honolulu Conference. Mayhew, in charge of the Education Section of the British Colonial Office, had also attended that conference. Groves was appointed, as from 1st April 1939, as Educational Adviser to the British Solomon Islands Protectorate.[7] His task was to investigate and report on the mission system of education then in operation and to formulate a new system in which the Government would co-operate with the missions, especially in the areas of academic and technical training.

Groves' work in the British Solomon Islands Protectorate (1940) showed him to his best advantage. He did his best work when thrown back upon his own ample resources and when he had no large bureaucratic machinery to keep in working order. He was an individualist, not an organization man. His personality expanded in compatible company.

> "Groves' *forte* was in diagonizing the state of a native community, its needs, expectations, and aspirations for the future, and in translating these findings into and relating them to a system of education adapted to the cultural situation, taking into account the changes wrought by culture-contact. Groves was at his best dealing on a personal basis with people. He had the rare intuition necessary to sense out the unspoken and often nebulous aims and hopes of the native community and the ability to formulate a system of education with enough flexibility to accommodate these."[8]

His *Report on Education in the British Solomon Islands* (1940)[9] provided the 'blue print' for post war educational development in the Solomons.

It speaks volumes for Groves' charismatic personality that, through personal contact with the missionaries in this Protectorate, he was able to persuade them to accept with good grace and in some cases even thankfully, a new system of education with more generous grants-in-aid to compensate for the restrictions of the new conditions and controls.

His wartime experiences (1942-1946)[10] gave him the opportunity to examine aboriginal society and culture in the Northern Territory of Australia, revisit Rabaul, the scene of his early New Guinea teaching years, and to serve a term in Army Education at Sogeri near Port Moresby, destined to be the scene of his post war work as Director of Education in the Provisional Administration of the Territory of Papua New Guinea, a position that he was to retain until his retirement in 1958.[11]

This was Groves' greatest challenge. The two Territories had been the arena for a major campaign of the Second World War during which education, except for some mission education at village school level, had lapsed. Warfare had disrupted the villagers' age-old way of life; it had destroyed their confidence and trust in the European rule of law and order. Their villages, their livestock, their gardens and with them the means of their existence had disappeared.[12] As Colonel J. K. Murray, the Administrator of the Provisional Administration of Papua New Guinea, pointed out in the Macrossan Lecture of 1947, reconstruction of the villages and rehabilitation of the villagers and their way of life were the first priorities.[13] Consequently, Health and Native Affairs had priority over Education for the limited funds available. Education was accorded the Cinderella's share. Yet in this period Groves faced the challenge with confidence and achieved a fair measure of success.

On Groves' arrival in Port Moresby in mid 1946, the Administration controlled one native school, the Sogeri Education Centre, a wartime legacy from Angau.[14] The most urgent necessity was for teachers in order to expand the Administration system of education from this small base. This lack of native teachers and of educated youth to train as teachers was the inevitable consequence of the wartime lack of education, and of the prewar paucity of any worthwhile education. The scarcity of teachers and of teacher trainees was destined to be-devil the education authorities in the Territory of Papua and New Guinea for many years. The necessity to educate primary school pupils before he could have teacher-trainees meant that Groves could expect no rapid educational expansion for at least eight years. There was no miraculous method to produce 'instant' teachers from illiterate village children.

In spite of the many handicaps imposed by the scarcity of men, money and materials under which Groves laboured, his efforts from 1946 to 1952 produced more results than did the previous Administrations over far longer period of time. Table 1, Comparative Education Statistics: Australian Administrations, clearly sets out this position.

TABLE 1

Comparative Educational Statistics: Australian Administrations

Area of Administration	Period of Administration	Time in Years	Statistics as at 30th June	Administration		
				Schools (Native)	Pupils (Native)	Teachers
Papua	1884-1942	58	1940	Nil	Nil	Nil
New Guinea	1921-1942	21	1940	8	588	N/A
Total				8	588	N/A[1]
Papua	1946-1952	6	1952	19	1,719	72
New Guinea	1946-1952	6	1952	55	3,115	163
Total				74	4,834	235
Papua	1946-1958	12	1958	84	5,846	221
New Guinea	1946-1958	12	1958	163	10,039	428
Total				247	15,885	649

Note (1) Statistics for Teachers and their division into native and **expatriate** groups are not readily available.

Statistics for this table come from *Annual Report on Papua* and *Annual Reports on New Guinea* for the years (1939-1940), (1951-1952), (1957-1958).

In 1952, Groves introduced through the Legislative Council a Bill for the Education Ordinance (1952) by which educational standards were set and some measure of control gained over the missions' educational systems. The loss of mission educational autonomy was offset by grants-in-aid to expand their sphere of educational influence. The short, simply worded Ordinance, largely the work of Groves, was the foundation of education in the Territory of Papua and New Guinea: on this, future developments were based.

The Departmental Inquiry into the management and efficiency of the Education Department in 1953, developed into a major crisis. Much has been written and argued concerning this investigation, the Report of which was never published and which is only now available to research workers.[15] Without entering into the rights and wrongs of this controversial affair, it must be noted that this was a major check to the progress of education in the Territory of Papua and New Guinea. The Committee[16] conducted its investigation in 1953 and submitted its Report to the Minister. Groves' "Observations and Comments"[17] were presented to the Minister in August, 1954. Yet is was 24th February, 1955,[18] before the Minister made known his decision concerning this matter. This hiatus of two and a half years held up development and any re-organization. Thus 1955 became the year of reorganization and 1956 the year of implementation. From February, 1955, it was the Minister of External Territories who was the real director of education in Papua and New Guinea. Groves was in reality his administrative officer. Nevertheless, within these narrow confines and small area of manoeuvrability, Groves still pursued his ideals and did not compromise his personal and professional integrity.

As Groves' retirement was in August 1958, he had a bare two and a half years to implement the re-organization demanded by the Minister. Much of this implementation fell to his successor, G. T. Roscoe.

Such are the educational and anthropological experiences of William Charles Groves. In summary, what were the achievements of his twelve years' directorate in Papua and New Guinea? How and in what ways did he influence native education in Pacific countries? What were his successes and his failures?

The main factor that must be considered is the personal qualities that Groves brought to the various positions he held. As a man, his deep, sincere Christian faith directed many of his actions and influenced many of his decisions.[19] His charismatic personality enabled him to influence other people and in most cases to obtain their co-operation and loyalty. As an educationist and anthropologist he was accorded international acceptance and acclaim. During the first seven years of Groves' directorship he had enjoyed a considerable amount of freedom of action. This was not the case during his last years as Director of Education when his relationships with those in political power tended to be marked with constraint and formality, which undoubtedly hindered the free flow and communication of ideas and suggestions.

Nevertheless, with few exceptions Groves was served by a small, loyal and dedicated teaching staff. The father figure that he projected through his deep personal interest in this staff earned him the affectionate title of 'Poppa' Groves.

His achievement was that, in the years of his directorate, he increased the number of pupils in the Administration native schools from the 165 pupils in the Sogeri Education Centre in 1946 to 15,885 pupils in 247 native schools with 649 teachers, of whom 526 were native teachers, most of whom had been educated and trained in this period.[20] On this one aspect alone, Groves' directorship demands recognition and acclaim.

Another contribution tthat he made to education in Melanesia — and especially in Papua New Guinea — was his concept of the changes wrought by culture-contact. His ideal curriculum embodied the principle of nativization and more especially the viewpoint that only by adaptation and adjustment to the changes wrought by culture-contact could the villagers come to terms with their changing society and culture. The process of accelerated cultural and societal evolution and rapid advancement of the village communities would, Groves maintained, depend upon the education system and the extent to which the process of nativization was inbuilt within its curriculum.

His area education schools[21] were established with the aim of educating the villagers *within their own environment* with the object of changing that environment through their knowledge and skills. Thus the system of education that he advocated and planned was an integral part of village society and culture. The aim was to socialize the children into their own culture and society: it was not to alienate them from their 'grass-roots'. Groves' idea of a literate, educated population has yet to be achieved. However, his Oral Approach to the teaching of English[22] is now accepted practice in the primary schools of Papua New Guinea. That is, Groves patiently worked for the ideal of mass literacy through univeral primary education while retaining and fostering the advancement of the village culture that gave meaning to the society.

Nevertheless, his anthropoligical training, experiences and field work had convinced him that 'literacy' did not solely mean 'literacy in the English language'. In Groves' scheme of things, the vernaculars and Pidgin had a place and a role to play especially where these were used as a basis to achieve first literacy in these and then in English.

Perhaps his greatest contribution to education in Melanesia — and particularly in Papua New Guinea — was the gaining of mission confidence and co-operation to achieve a national system of education. His Nauruan curriculum, the Solomon Island Report and the Educational Ordinance (1952) of Papua and New Guinea were the bases of postwar education in three Pacific countries.

But what of his failures and lack of achievements? The list supplied by the Committee of Investigation (1953) collapses under objective scrutiny and analysis.

Groves has been accused of doing nothing for secondary education. These critics appear to forget that provision for secondary education postulates a pool of primary school graduates. Groves' chief concern was to get these primary school graduates. The few students educated to the standard required for entrance to secondary education were given scholarships to Australia. Roscoe has argued that the money spent on this could with more profit have been spent on educating more pupils within their own country. He sees this as the point when detribalization from their 'grass roots' became an almost general characteristic of the educated élite.[23] In the meantime small expansion of secondary educational facilities did take place especially within the mission systems. The aim, of course, was to produce primary school graduates that would gain the Administration Secondary School Scholarships to Australian secondary schools. However, the main project, the proposed Wau High School of the Administration education system, was abandoned due to a Ministerial decision.[24]

Summing up, I shall again quote from my unfinished thesis on this topic:

> "[Groves] lacked the managerial training that would have facilitated his direction of a bureaucratic organization. He was indeed too interested in *people* to place their welfare below that of an organization and too humane and sensitive to the feelings of others to have the ruthless streak of impartial efficiency that characterizes the most successful executive.
>
> Later reports — the Foot Report, the Currie Report and the World Bank Report — all in the early 1960's, vindicated Groves' belief in the nativization of education. Groves would probably feel more affiliation with the educational aims and aspirations of the 1970's than he did with those of the 1950's. Consciously or unconsciously, many of the educationists of Papua New Guinea of the 1970's advocate today those very principles and tenets of native education and educational philosophy that Groves propounded."[25]

REFERENCES

[1] His lecturer at the Sydney University was Dr. Firth. His life long friendship with Professor Elkin and Dr. Firth stems from this period.

[2] Groves' Reports are found in *Oceania*. The Library of the University of Queensland has the complete set of issues of this periodical.

[3] W. C. Groves Papers: Box 1, File 22. The Groves Papers are held in the New Guinea section of the Library of the University of Papua and New Guinea.

[4] Ibid. Box 7, Files 1-8.

[5] Ibid. Box 4, Files 1-25.

[6] Also held in the Library of the University of Papua and New Guinea.

[7] W. C. Groves Papers: Box 1, Files 1-36. Also Box 5, File 46.

[8] Duncan, M.: "W. C. Groves: His Work and Influence on Native Education especially in Papua and New Guinea (1946-1958)", uncompleted Thesis (M.Ed.), University of Queensland.

[9] This Report is generally known as *The Groves Report*. The copies sent to the British Colonial Office were destroyed when Whitehall was bombed during the Second World War. The sole remaining copy, found in the ruins of Tulagi, B.S.I.F. after the war, is now held in the Secretariat at Honiara, the postwar capital of B.S.I.P. Extracts from this report have been placed in the W. C. Groves' Papers.

[10] W. C. Groves Papers: Box 5, Files 22-27.

[11] Ibid. Box 3, Files 1-28.

[12] cf. Fry, T. P.: *Relief and Rehabilitation in Australia's Territories in New Guinea.* This Report is in the Library of the University of Queensland.

[13] Murray, J. K.: "The Provisional Administration of the Territory of Papua-New Guinea", the Macrossan Lecture of 1947, held in the Library of the University of Queensland.

[14] A valuable data source is the Ralph Collection, Bowral, N.S.W. especially the rough notes in a folio marked "Sogeri Education Centre". Many of the documents relating to this centre appear to be missing from official archives in Papua-New Guinea.

[15] A recent addition to the W. C. Groves' Papers from the Ralph collection.

[16] The Investigation (1953) Committee consisted of:
- (i) T. A. Huxley, the Public Service Commissioner;
- (ii) R. Marsh, Assistant Secretary of Department of Territories;
- (iii) D. McCarthy, Administrative Officer, Welfare and Social Advancement Branch, Department of Territories.

[17] W. C. Groves Papers: Box 3, File 19.

[18] Ibid. Box 3, File 17, Item (W).

[19] Dr. R. D. Goodman, University of Queensland, served under him in Army Education. Goodman's summing up of the man is that Groves was 'a Christian gentleman'.

[20] cf. Table 1 this paper.

[21] (a) W. C. Groves Papers: Box 3, File 28, Items (A) to (D).
(b) South Pacific Commission Social Development Notes, No. 7.

[22] In Papua in the pre 1942 period, grants were given to missions on the basis of the number of pupils who could read in English. When Roscoe visited schools soon after his arrival, he examined the reading in mission schools. On many occasions he put his hand over the printed page and told the pupils to go on. They did go on, page after page, but they did not comprehend what they were reading. This converted Roscoe to the Oral Approach as a means of teaching English. It also explains why, though Reading (or recitation?) in English was taught in Papua for many years prewar, there was such a small increase in the number of native people who spoke English.

[23] Roscoe maintains that an élite will always emerge in every society and that this method of secondary education accelerated the process, while at the same time fostering the detribalization and ultimate isolation of the student from his own society, culture and environment.

[24] Administration planning was so advanced that crockery for this school with the insignia 'Wau High School' was already in stock. Some of this stock was used in the Administration mess at Lae.

[25] Duncan, M.: op. cit.

NICHOLAI N. MIKLUHO-MAKLAI (1846-1888), PIONEER EDUCATOR IN NEW GUINEA AND MELANESIA

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Introduction:

A fundamental respect for the individual and the group motivated Mikluho-Maklai. The centenary of his first arrival in Melanesia and New Guinea, September 1971, has recently been celebrated in the Madang District and in his homeland, then Imperial Russia, now U.S.S.R. Accounts of his life and work[1] have stressed his varied preparation for a short life of intense activity in New Guinea, Melanesia, the East Indies, Malaya and other islands of the South Pacific. This consisted of exploration, anthropological and ethnological investigations, with humanitarian representations to the controlling authorities. His writings, particularly his diaries and correspondence[2], provide evidence for a number of complementary studies, one of which is his role as educator. There are at least three aspects of this:

(i) the communicator of knowledge for tertiary institutions and learned societies, the professional interpreter;
(ii) the investigator of the developmental needs of his indigenous associates, the local social interpreter;
(iii) the citizen of the world with responsibility, the wider social interpreter.

The Professional Interpreter:

He was not an educator in the formal sense. Nor were many teachers of his day, especially those in Russia. Although there was a gymnasium created along with, and attached to, the Academy of Sciences in 1725, becoming the first Teachers Seminary under Catherine the Great in 1782[3], there was a scarcity of teachers at all levels in 1862[4], towards the end of Mikluho-Maklai's secondary schooling at St. Petersburg. Only 2½% of children of school age attended any school in the Russian Empire at that time[5]. During the period from the triumphant year of Napoleon's retreat, 1812, to the disaster of the Crimean War, 1854-6, there arose dissatisfaction with the dependence on English and German educational inspiration and a recognition of Russian inferiority. A. S. Norov, Minister of Public Education, had said in 1855,

> "If our enemies triumph over us, it is due solely to the superiority of their education."[6]

One who influenced Mikluho-Maklai's dedication to responsibility, I. Turgenev wrote in 1862,

> "The role of the educated class in Russia is to transmit civilisation to the people until they can decide for themselves what they will repudiate and what they will accept."[7]

Prof, A. Nikitenko, who rose from serfdom to nobility, had remarked in 1863, "Up to the present we have been living off borrowed mind. We have developed no native science except nihilism."[8]

The rise of nihilism, following easing of conditions of university entry in 1859, resulted from overcrowding of certain students in slum conditions, rejecting formal instrucion and seeking the inspiration of journalists and philosophers. This led to friction with the government authorities and closing of the universities from December 1861 to the autumn of 1863[9], the year in which Mikluho-Maklai recorded interest in plant and animal physiology in his notebooks[10]. This disturbed period also featured official interference with the grass-roots enterprises by the intellectuals, the Sunday schools and other spontaneous efforts such as L. Tolstoy's co-operative school at Yasnaia Poliana[11].

It was therefore not surprising to find Mikluho-Maklai studying law and philosophy at the University of St. Petersburg in 1864, being associated with the local ferment and moving to Heidelburg for alternative study[12]. He later named two prominent peaks in the New Guinea Finisterres after Kant and Schopenhauer. In 1866 he commenced studying medicine at Leipzig[13] and the same year moved to Jena to pursue his special interests in palaeontology and zoology (under E. Haeckel) and comparative anatomy (under K. Gegenbaur)[14]. Like most tertiary specialists of to-day, he studied with those active in the field (accompanying Haeckel and his team to the Canary Islands 1866-7)[15], then conducted his original investigations (his extensive tour of the Red Sea 1869)[16]. He published his findings in Germany and Russia, then, for his later travels, in Batavia and Sydney[17]. He described these and his collections to learned societies: the Imperial Russian Geographical Society in St. Petersburg, the 2nd Congress of Russian Naturalists and Physicians in Moscow, the Linnean Society of N.S.W. in Sydney[18].

He revealed his practical skills through his drawings and medical attention to the indigenes of the Maklai Coast (Madang District). On the lighter side, he used some of the alcohol (kept to preserve his specimens) apparently to set fire to water, a demonstration testing the indigenes' impressionability, which assisted in spreading his reputation amongst neighbouring villages, a means of further contact[19]. Aids to teaching!

Like many tertiary specialists he had to campaign extensively for aid to extend his travels and researches. His own family, Russian, Malayan, Dutch and Australian acquaintances, societies and governments received appropriate prompting[20]. It may be asserted that he was better equipped than most as a communicator of knowledge. Do many to-day speak at least five languages or have been prepared in at least four universities? Being acutely aware of the value of adequate facilities, he had the vision of establishing marine biological laboratories at strategic sites throughout the world. He originated public discussion of this with the Imperial Russian Geographical Society in 1868[21]. The first was opened by an associate A. Dohrn at Naples in 1875, the year in which he acquired land for the same purpose at the southern tip of the Malay Peninsula[22]. He opened the second in Sydney in 1881[23].

Mikluho-Maklai was also very conscious of his debt to his teachers and associates. His diaries record the pains he took to write and send specimens of special interest to P. Broca in Paris, R. Virchow in Berlin, K. Gegenbaur in Strasburg, K. Behr in St. Petersburg[24]. When the "Izumrud" arrived to rescue him at Astrolabe Bay in 1872, he described the background to his decision to leave in the better interest of communication and extension of his work, in justification of the investment of his sponsors, the Imperial Russian Geographical Society[25]. The Society's President was Grand Duke Constantine, head of the Navy and brother to the reigning Czar Alexander II. Mikluho-Maklai named the harbour where he first landed and one of the local peaks after Constantine[26]. Constantine's stabilising influence in civic, cultural and fiscal affairs had no doubt helped further to prevent the spread of disorder which characterised Mikluho-Maklai's formative years and encouraged such influence as the ailing monarchy could bring to bear in his favour[27]. Lady Maclay[28] received an Imperial pension from her husband's death in 1888 till the Revolution of 1917[29].

Mikluho-Maklai's report to the Imperial Russian Geographical Society on 30 September 1882 is a competent condensation of information from his records and a compelling self-defence of his attitudes and decisions[30]. This report alone is sufficient evidence of his worth as a tertiary educator.

The local social interpreter:

Mikluho-Maklai's interpersonal relations, which led to the success of his investigations, are illustrated by his association with Tui from Gorendu, who taught him part of at least nine local dialects, explained customs, made useful introductions for inter-village travel and, through accident, became a subject to his medical skill[31]. The study of individuals and groups during his wide-ranking travels gave Mikluho-Maklai an estimate of the potential and vulnerability of those to whom he was the first European visitor[32]. It was his fundamental respect for the indigenes as equals, not merely objects of study, that made him reluctant to hunt for adequate food before they trusted him sufficiently to explain the use of firearms[33]. A succession of quotations reveal the growth of this trust:

> "Until they trust me I will achieve nothing with them."[34]
>
> "As soon as I am in better relationship — I will go hunting so as to diversify the menu."[35]

"They are so accustomed to me and are so sure that I will not cause them any harm, that I have ceased to embarrass them with regard to the use of firearms."[36]

"To-day I have completed exactly a year since I first set foot on the coast of New Guinea. In this year I have prepared for myself the ground for many years of investigation of this interesting island, I have attained the complete trust of the natives and, in case of need, I can be confident of their help. I am ready and will be glad to remain several years on this coast."[37]

Likewise he was not tempted by offers of wives, even by the invasion of his bed at Gumbu, and took particular pains during his early village intrusions to allow women their privacy:

> "As usual I warned of my approach by a loud whistle."[38]

He wrote of the villagers of Bongu, "they want me to stay with them always. I should take one, two, three or as many wives as I wish and not to contemplate going away to Russia again or any other place." He told the men, "I do not need a wife because wives talk too much and are generally noisy and Maklai does not like that."[39]

Lady Maclay wrote in her diary, 31 December 1899, 21 months after his death, "No one knows what a darksome place this world is to me without his love and care and tenderness — he was absolutely good as a husband and a father."[40]

Early in his village contact he wrote, "I am convinced that a knowledge of the language is the only means to become acquainted with the native customs."[41] He carried a notebook and sketchbook everywhere he went. "Although I speak the Bongu dialect fairly well, nevertheless it would still require years to actually become acquainted with their way of thinking and their way of life."[42] In seeking the word for "bad" he gave them salty, bitter or sour substances to taste[43]. In seeking samples of hair, he exchanged his own[44]. We also find him, despite his chronic malaria and privations, joining in a footrace with five, "To my surprise my legs turned out to be stronger and I beat them all"[45]. However, he was no swimmer and could not ford the local rivers without their help[46].

We can see throughout the records evidence of intensive questioning by Mikluho-Maklai of individuals and groups and by these in return. Consistent with modern sociological aims of education, in particular for the context of emergent societies, he recognised the fundamental importance of relating the educational bridge to European culture to the village needs and traditions, stressing agricultural and manual skills with his descriptions of daily activities. Three points of the seven proposed by W. C. Groves in 1936 follow:

3. That society's instrument for such adaptation or adjustment is education: education interpreted in the widest possible sense.
5. That a knowledge of the indigenous culture — is pre-requisite to the working out of a system of education fulfilling those requirements.
6. That this demands an alliance of the principles of social anthropology and education, and the co-operation of these two in carrying out a programme of educational research[47].

These principles have been recommended in the recent TPNG Education Department publications and representative gatherings of the community[48], hence these resolutions:

3. Prepare children for the changing society of Papua New Guinea.
4. Teach children to respect the views of their parents and the village community.
6. Give children practical knowledge so that they will be useful in any society.
12. To teach children how to live a full and useful life; not to be lazy and wait for others to do things for them. This can be achieved through traditional artifact practice work in school as project work and the parents can foster them to work at home like agriculture or skill of art and craft.

14. To teach children how to work towards better society; that this can be done through selecting good things from the old and adding to the new ones which are suitable for our society in Papua New Guinea.
16. To teach children how to reconstruct their cultural heritage through practising traditional dancing, folk songs, drama and craft, etc.[49]

Mikluho-Maklai introduced many exotic plant foods to the Maklai Coast and to the islands of Astrolabe Bay[50]. He also recorded a number of local adaptations of European materials such as glass for shaving, a scrap of iron for an axe-head, nails as drills. "This demonstrates the powers of observation and the desire of the natives to acquaint themselves by experience with objects which are for them new"[51]. He also recorded a number of instances of parents and children as teachers of skills, the play of children being related to the tasks of adults in the social life of the village[52]. Likewise various skills were capable of development in suitable educational programmes: observing, predicting[53], drawing, manufactures, mime and the use of aids to food-gathering and defence[54]. His balanced view of the educational programme is revealed here:

> "In our civilisation specialisation inclines more and more to the development of only some of our capacities and to a one-sided development, to a narrow differentiation. — I do not preach the return to the primitive level of human development, but at the same time I am convinced by experience that for every person their physical development should run more or less parallel and not be supplanted by the predominance of the intellectual development"[55].

Although the teaching of English is the current important task of PNG schools in preparation for world-wide relationship[56], P. V. Meere has given credit to missions for preserving the local language in particular situations in the interests of educational relevance[57]. Historically the missions were the major instrument of education from shortly after Mikluho-Maklai's time to 1946 when W. C. Groves became Director of Education[58]. The Summer Institute of Linguistics continues to break language frontiers using principles similar to Mikluho-Maklai's.

The earlier days of the German and Australian administrations saw little attention being given to the land rights and other sensitive issues of indigenous tradition and culture. The Second World War added its component to a confusion of aberrations from Christian and local animistic practices to give the successive "cargo" cults[59]. Mikluho-Maklai has not escaped legendary entanglement in these. He rather deserved the foresight of his inter-cultural skills to be interwoven into a developing educational programme which might have done much for the satisfaction of the villagers for whom he eventually gave his life. The extent of this foresight may be understood by the following extracts from his "Maclay Coast Scheme", one of his collection of papers held by the Mitchell Library:

> "My first intention is to assist the natives of the Maclay Coast on the basis of the already existing indigenous customs and usages, to reach a higher and more general stage of purely native self-government, which would extend over a large area, and whereby the various communities

(villages) at present isolated would become united for the common purpose of mutual interest and indigenous legislation. A Native Great Council would be established." p.38.

"As the making of roads, bridges, etc, etc, the affording of greater facilities for landing, the establishment of primary schools, and some other measures of common utility, would be attended with certain expense, it would only be fair, that all the community should contribute towards said expense, by imposing on all adult males an adequate tax, payable in natural products, or an equivalent of personal service 'pro bono publico', or labour of a corresponding value." p. 39.

"In a short time, the organization of affairs on the Maclay Coast would be so far completed that I should be able, on behalf of the Great Council of Tamo-Boros, to invite the Government of Great Britain to establish a Consulate in this part of New Guinea, which might perhaps even lead to the Great Council later on soliciting a British Protectorate over the Maclay Coast of New Guinea." p. 61.

Biological Station at Watson's Bay near Sydney, 24th November, 1881.

The Wider Social Interpreter:

Mikluho-Maklai's intimate experiences in the villages, his philosophical interpretation of man's worth and needs, together with his active defence of truth[60] and justice[61], fitted him for the championing the indigenous cause with the authorities of Russia, Germany, England and Australia. C. D. Rowley records the opposition of Sir Arthur Gordon and the Aboriginal Welfare Society to the annexation by the Australian states of eastern New Guinea[62]. It is also pertinent to record that Mikluho-Maklai had written to Gordon 23 January 1879 on the needed protection of the rights to their land of his friends on the Maklai Coast and from traffic in arms and intoxicants in the South Pacific in general[63]. He had also met and explored with Rev. J. Chalmers of the London Missionary Society shortly afterwards and they had jointly written to the British Secretary of State for the Colonies in June 1883 asking for recognition of land-rights, freedom from slavery and protection from intoxicants. Germany annexed north-east New Guinea on 16 November 1884, but before that on 1 October, Mikluho-Maklai had written to Bismarck seeking similar protection. He later protested to Bismarck on the annexation of the Maklai Coast which was more logically Russian if any European influence was allowed. The British Protectorate of South-east New Guinea (Papua) followed and boundary arrangements were agreed with Germany in 1885.

The appointment of Sir P. Scratchley as First Special Commissioner to the Protectorate, 6 November 1884, included in Clause II: "And we do require you, to the utmost of your power, to promote religion and civilisation among the native inhabitants of the Protectorate: and you are especially to take care to protect them in their persons and in the free engagement of their lands and other possessions, and by all lawful means to prevent and restrain all violence and injustice which may in any manner be practised or attempted against them"[64]. Rev. J. Chalmers recorded later: "The smallest amount of government interference will be the best, and any attempt to Anglicise the natives or their customs should be strictly prohibited"[65]. In this connection, L. Tolstoy wrote to Mikluho-Maklai:

> "As far as I know, you are undoubtedly the first to show by actual experience that a human being remains a human being everywhere, that is a good, sociable creature who must be treated with kindness and honesty, not with guns and vodka — your experience with intercourse with savages constitutes an epoch in the science which I serve, in that science about how men should live with one another"[66].

What was the source of this drive of Mikluho-Maklai? He rarely permitted himself the distraction of recording his feelings, about his source of inspiration or the reason for his abstemious living. His patriotism did not blind him to the unnecessary vandalism of the "Vitiaz" sailors[67], nor to the remoteness of Russia's ultimate concern in his affairs which led him to ask his wife to destroy his manuscripts[68]. Whatever he may have acquired of Kant's sensory transcendentalism or Schopenhauer's flight from the grimmer realities to asceticism, he also seemed to be in tune with his wife's simple Christian beliefs[69]. Here are two of a few extracts from his diaries:

> "I only rest completely and am content when I am alone and in the middle of this luxuriant growth. — I have regrets only when I come across problems which, in consequence of my insufficient knowledge, I cannot explain"[70].

> "The total silence is broken only by the call of birds and the almost continuous song of the cicada. At times a ray of sunlight broke through. The vegetation, freshened by the night's rain, at such moments seems to shine, and brightens up the walls of my palazzo. The distant mountains seem more blue and the silvery sea glitters alluringly in its frame of greenery. Then once again it gradually grows dim and becomes calm, immobile. The eyes are rested also. In a word it is peaceful, good —
>
> Noisy people also did not interfere to-day; no one came. I have been thinking that in a state of great peace (true, it is difficult to attain) a man can feel perfect happiness. Probably millions of people think thus, but on the other hand, millions seek happiness in its opposite. —
> I regret that my eyes are not adequate to notice and see everything around me, and that my brain hasn't sufficient power to understand it all"[71].

Mikluho-Maklai had some fellow-feeling with Ezekiel: (Ch. 3, v. 15, A.V.)

> "and I sat where they sat and remained there astonished seven days."

Acknowledgements:

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[4] P. L. Alston, "Education and the State in Tsarist Russia", Stanford, '69, 428.

[5] W. H. E. Johnson, op. cit., deduced from Table 35, 290.

[6] P. L. Alston, op. cit. 44.

[7] ibid., 60.

[8] ibid., 44.

[9] ibid., 57.

[10] N. A. Butinov, op. cit., 3.

[11] W. H. E. Johnson, op. cit., 149.

[12] [13] N. A. Butinov, op. cit., 4.

[14] E. S. Thomassen, op. cit., 4.

[15] ibid., 5

[16] F. S. Greenop, op. cit., 36.

[17] These are listed in E. S. Thomassen in part, in F. S. Greenop in part and in the Moscow Academy of Sciences "Works" in full, including 34 papers and notes presented to meetings of the Linnean Society of N.S.W., 1878-1886.

[18] Some dates of these addresses were 1868, 1869 at Moscow, 8 Oct. 1870 and 30 Sept. 1882. The first of his Sydney addresses was 26 Aug. 1878.

[19] Diaries, 14 Dec. 1871, 74.

[20] His addresses listed in 18 and in Melbourne. The co-operation of the Maharajah of Johore, the King of Siam and the Governor of the Dutch East Indies.

[21] Letter to A. Dohrn, Director of the Zoological Station at Naples, submitted by T. H. Huxley and published in "Nature", XII, Aug. 26, 1875, 332-3

[22] ibid. the letter was written from Johore.

[23] Sydney Mail, May 14, 1881.

[24] Broca, Report, 290. Virchow, Report, 325. Gegenbaur, Diaries, 13 Dec. 1871, 72, Behr, visit to the Philippines, Report, 311.

[25] Diaries, 20 Dec. 1872, 214.

[26] Diaries, 26 Sept. 1871, 18:27 Feb. 1872, 111:12 Aug. 1876, 223.

[27] P. L. Alston, op. cit., a number of entries.

[28] Mikluho-Maklai is a near transliteration of the Russian name, with the "h" having the effect of the Scottish "ch" in "loch". He used the French form of the name in Australia, "de Miklouho-Maclay", and this has been retained by his family and descendants. It has been conveniently shortened to Maclay for general use. The Russian form is retained in the Australian Dictionary of Biography (in press).

[29] F. S. Greenop, op. cit., 29.

[30] Report, 284-330.

[31] Tui is described regularly throughout the first stay diary, with less attention during the second. He died between the second and third visits.

[32] He studied the inhabitants of 13 villages 1871-2 and of 22 villages 1876-7 in the Madang District apart from complementary study during his other travels in the South Pacific, Melanesia, East Indies and Malaya.

[33] Diaries 1 Oct. 1871, 24.

[34] ibid. 6 Dec. 1871, 68.

[35] ibid. 25 Dec. '71, 79.

[36] ibid., 29 Mar. 1872, 134.

[37] ibid. 20 Sept. 1872, 206.

[38] ibid. 3 Dec. 1871, 63.

[39] ibid. 13 Aug. 1872, 192-3.

[40] Mikluho-Maklai wrote to Commodore Wilson, R.N. in Australia, 4 Mar. 1884: "You are perfectly right when you call me a happy man. Indeed, I realise now that a woman is able to bring real happiness into the life of a man who never could believe that such a thing existed." F. S. Greenop, op. cit., 220.

[41] Diaries, 17 Nov. 1871, 58.

[42] ibid. 3 Nov. 1872, 212.

[43] 25 Jan. 1872, 97.

[44] Diaries, 17 Nov. 1871, 58.

[45] ibid. 17 Jan. 1873, 94.

[46] 29 Mar. 1872, 135.
[47] W. G. Groves, "Native Education and Cultural Contact in New Guinea", Melb. & Oxford Univs. Press., 1936, 23.
[48] "Working with People", TPNG Education Dept. Teacher Training Division, no date.
[49] "Primary Curriculum Seminar", PNG Education Gazette, 6, (1), Feb. '72, 14-5.
[50] Beans, squash, maize from Tahiti, Diaries 18 Oct. 1871, 41; pumpkin, 30 Apr. 1872, ibid. 162; durian, mangosteen, mango, breadfruit, orange, lemon, coffee, pineapples and other useful garden vegetables from Macassar, Mar. 1883, ibid. 273. Maize, Oct. 1876, also transplanted coconuts, ibid. 226.
[51] ibid. 27 Oct. 1871, 45; 26 Apr. 1872, 160; May 1877, ibid. 240.
[52] Diaries 30 June 1872, 182; ibid. 13 July 1872, 186; ibid. 30 July '72, 190.
[53] ibid. 11 July, 1872, 184; ibid. 31 July, 1972, 190; ibid. 24 Aug. 1972, 197.
[54] ibid. 6 May 1872, 164; ibid. 9 Apr. 1872, 151; ibid. 5-6 Dec. 1876, 229.
[55] ibid. 16 Nov. 1871, 57.
[56] K. R. McKinnon, "Schools, Colleges & Society", Aust. Col. Ed. 1967, 35.
[57] P. V. Meere, "Mission Education in P.N.G.", Aust. J. Education, 12, (1), Mar. 1968, 50.
[58] K. R. McKinnon, Education in P.N.G.: "The Twenty Post-War Years", ibid., 2.
[59] P. Lawrence. "Road Belong Cargo", chapters III to VIII; R. C. Ralph, "Some Notes on Education in German N.G.", PNG J. of Ed., 3, 71-7. J. McAuley, "We are Men — What are You?", Quadrant, 4, (3), 1960, 70.
[60] "Not wishing to tell a falsehood", Diaries, 18 Dec. 1871, 78.
[61] During his S.W. New Guinea episode, bringing a murderer to justice, Rep. 305.
[62] C. D. Rowley, "The New Guinea Villager", Cheshire, Melbourne, 1968, 59-60.
[63] F. S. Greenop, op. cit., 188-195, 209-215.
[64] J. Mayo, "The Protectorate of N.G. 1884-8. An Oddity of Empire", in 2nd. Waigani Seminar, "History of Melanesia", UPNGANU, 1969, 20.
[65] J. Chalmers, "New Guinea, Past, Present and Future", Proc. Royal Col. Inst., XVIII, 1887, 105.
[66] F. S. Greenop, op. cit. 201.
[67] Diaries, 29 Dec. 1871, 84.
[68] A number of entries in Lady Maclay's 1888 diary leave doubt that she complied
[69] Lady Maclay's epitaph on her husband's gravestone, Volkov Cemetery, St. Petersburg reads: "Well done, good and faithful servant, thou hast been faithful over a few things, enter thou into the joy of thy Lord." "Come unto Me all ye that labour and are heavy laden, and I will give you rest."
[70] Diaries, 25 Dec. 1871, 78-9.
[71] ibid. 8 Fed. 1872, 98-9.

Some events in Mikluho-Maklai's life and career:

1846	17 July, born at Rozhdestvenskoye, 160 miles SE of St. Petersburg. Private tutor, then secondary schooling at St. Petersburg.
1864-8	University career at St. Petersburg, Heidelburg, Leipzig, Jena. Return to Russia following Canary Islands excursion. Publications.
1869	Messina with Dohrn, Red Sea excursion. Contracted malaria. Behr suggests New Guinea.
1870	Preparation for New Guinea. Voyage from Krondstadt on "Vitiaz". Crossing of Atlantic. Cape Horn.
1871	Peru. Pacific Islands. Melanesia. New Guinea, 20 September 14 months.
1872	"Izumrud" voyage through islands to Philippines.
1873	Hong Kong, Canton, Singapore, Batavia (convalescence). Publications. East Indies. S.W. New Guinea. Mikluho-Maklai family acquire estate.
1874	East Indies. Batavia (convalescence). Publications. Malay Peninsula.
1875	Batavia (convalescing). Publications.
1876	Islands N.W. and N of New Guinea. New Guinea 16½ months.
1877	10 November "Flower of Yarrow" voyage through islands to Philippines, thence through islands west of Borneo to Singapore.

1878	Hong Kong. Sydney 18 July. Proposal of biological station to Linnean Society. Association with William Macleay.
1879	Slave traffic campaign. "Sadie F. Caller" voyage through Melanesia from New Caledonia to the Louisiades.
1880	"Ellengower" voyage S.E. New Guinea and Torres Str. islands, Nth. Queensland. Comparative anatomy studies Brisbane. Ethnological and palaeontological studies inland in Queensland.
1881	Biol. station, Aust. Museum and Sydney Hospital researches.
1882	Melbourne. "Vestnik" to Singapore, "Asia" to Kronsdadt. Moscow. Berlin.
1883	London. "Chyebassa" and "Skobolev" voyages to islands north of N.G. New Guinea. Admiralties. Hong Kong. Brisbane. Sydney. Biological Station.
1884	27 February Marriage to Margaret Clark. 1885 Melbourne. 1886 Russia.
1887	London. Sydney. With family to St. Petersburg. Illness. Death 2 April 1888.

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